Mexico-China Workshop on Renewable Energy and Environment Remediation

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Instituto de Investigaciones en Materiales

Major topics for discussion:

- Control of the nano- and micro- structure and composition of materials
- Optimization of the physical and chemical properties of nanomateriales and their response to environmental conditions
- Novel strategies to harness the benefits of enhanced surface-to-volume ratio
- Particle/quasi-particle confinement
- Use of nanostructured system design for enhanced device performance

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2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Welcome to the Third NANOMXCN Workshop

"Mexico-China Workshop on NANO Materials / Science / Technology: Renewable Energy and Environmental Remediation", 19-21 Aug 2017, as part of the XXVI International Materials Research Congress (IMRC) 20-25 Aug 2017, Cancun, Mexico.

NANOMXCN (read: NANO-Mex-China) is a workshop series aimed to promote collaboration opportunities between Mexico and China, including Hong Kong, with the help of friends and colleagues worldwide: the workshop is open to all registered IMRC participants (www.mrs-mexico.org.mx/imrc2017/).

Since its origins, NANOMXCN has received the strong support of the Mexican Government with Funding from Mexico's National Council of Science and Technology (CONACYT) and generous planning support from the Mexican Embassy in P. R. China and The Consulate General of Mexico in Hong Kong and Macau.

Planning for this initiative started in 2014 and the first event was held in August 2015. It consisted of a work visit (10 - 14 Aug, 2015) by leading scientists of China and HK SAR to several research centers in the Mexican cities of Monterrey, San Luis Potosi, Leon, and Mexico City. This also included a courtesy visits to CONACYT's General Director as well as to the Director General of Technical and Scientific Cooperation of the Mexican Ministry of Foreign Affairs. The work visit was followed by a Scientific Workshop in Cancun (15 - 16, Aug 2015), as part of the XXIV International Materials Research Congress. At this first meeting, there were 47 works presented form 10 institutions from China, 8 from Mexico, 3 from Hong Kong, as well as others from Canada, USA, France, and Germany.

The second NANOMXCN Workshop took place in City University of Hong Kong, 4 - 6 Dec 2016 with chief sponsorship from CONACYT, the K. C. Wong Education Foundation, 王寬誠教育基金會, and the Red Global-MX of The Institute of Mexicans Abroad. There were 52 presentations with participation of China, Mexico, Hong Kong, Japan, New Zealand, Germany, and USA. We were honored to have representatives from academicians of 6 National Academies of Science or Engineering (Mexico, China, USA, France,

TWAS). The workshop was followed by a work visit (7 - 11 Dec, 2016) to research centres and universities in Shanghai, Beijing, and Xi'an. This included courtesy visits to the National Natural Science Foundation of China (NSFC) with representatives of the Chinese Academy of Sciences (CAS) at the National Center for Nanoscience and Technology, (NCNCT) CAS, an including representatives from the Ministry of Science and Technology of China (MOST). Additional information about the two preliminary events can be found at www.nanomxcn.com.

Thought these efforts our chief goal has been to be inclusive in inviting the scientific communities to take an active role in evaluating the need to promote and design new collaborative opportunities between these two friendly countries. In doing so, the underlying working principle is that the shared critical problems faced by our societies, and the complementary expertize of our research institutions will by far outweigh the difficulties and limitations encountered in this process. In these three years we have enjoyed strong support of leading founding agencies and we are grateful for the opportunity to carry these activities and explore the extent of our findings and aspirations.

As we close one cycle, with the first return of the workshop to Mexico, the largest NANOMXCN event yet will showcase seventy presentations from fifteen Mexican and twenty-two Chinese and Hong Kong SAR research institutions plus presentations from colleagues from Canada, France, and Spain. It is also important to highlight that before, during, and after the NANOMXCN technical program there are a number of significant activities that share the common goal to promote increased Sino-Mexican scientific collaboration opportunities. Due to logistic as well as time constraints not all of them could take part during the workshop period in Cancun; however, we invite all to inquire and share your views and perspectives with your fellow workshop delegates that might have participated. These activities include:

- NSFC Sharing Session lead by Prof. ZOU Liyao, Deputy Director General, Bureau of International Cooperation of NSFC. This special session, addressed to all IMRC participants, seeks to "*promote partnerships between researchers in China and Mexico and the two research communities in areas of nano science research".* Sunday 20th Aug 14.30 to 16.30 in Room Tulum H.

- Participation of a strong delegation of leading Chinese scientists in the NANOMXCN workshop, 19-21 Aug, whose participation has been secured through the efforts and support of the NSFC.

- Increased participation of the Academia Mexicana de Ciencias (AMC) through the first “Forum on collaboration strategies AMC-NANOMXCN Mexico-China: NANO Materials / Science / Technology for Renewable Energy & Environmental Remediation” on Thu. 17 Aug 2017. This event is co-organized with AMC and is part of the work visit program that will take place in the cities of Ensenada, Queretaro, Mexico City and Merida before the workshop (13-18 Aug 2017).

- Participation of Mr. Zhu Hao, Director for Science & Technology of the Embassy of the Peoples Republic of China and Representative of the Ministry of Science and Technology of China (MOST) in Mexico with a talk titled: “Bilateral Mexico-China collaborative policies and renewed Sino-Mexican scientific collaboration opportunities that could support initiatives like NANOMXCN”.

As the activities highlighted show, there are multiple encouraging and highly positive signs from leading institutional agencies and bodies. We look forward to learn from their own assessment and evaluation of the potential for Mexico-China collaboration opportunities in the time and form appropriate to their respective mechanisms.

On our side, the NANOMXCN community continues to invite all interested to join us in exploring and imagining the full extent of the opportunities for scientific collaboration between Mexico and China, including the HK SAR, which could be developed in the near- to medium- term future. In welcoming you to the 2017 edition of this on-going effort we would like to extend our sincere thank you for deciding to include us in your busy schedules. It is first and foremost the combined expertize of all our speakers and participants that gives sense to this effort. We very much appreciate the time and trust you place in attending the NANOMXCN Workshop and hope you enjoy the technical programme as much as the social and cultural opportunities. We look forward to hear your comment s an opinions on the best way to move this initiative forward and kindly invite you to take part on the planning meetings on Monday 21 August.

Welcome to NANOMXCN – 2017!

Sincerely, the NANOMXCN organizing committee

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

NANOMXCN 2017 International Advisory Committee

- Pedro Alvarez, Rice University, USA
- Yip-Wah Chung, Northwestern University, USA
- Jiang Guibin, Research Center for Eco-Environmental Sciences, CAS, PR China
- Isaac Hernández-Calderón, CINVESTAV Zacatenco, Mexico
- Chen Jiesheng, Shanghai Jiao Tong University, PR China
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- S. Y. Tong, South University of Science and Technology of China (SUSTC), PR China
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- Ching-Ping Wong, CUHK, HK SAR

NANOMXCN 2017 Organizers

Juan Antonio Zapien
Department of Physics and Materials Science
City University of Hong Kong, HK SAR

Sandra Rodil
Instituto de Investigaciones en Materiales
Universidad Nacional Autónoma de México,
México

Iliana E. Medina Ramírez
Departamento de Química
Universidad Autónoma de Aguascalientes, México

JIANG Guibin
Research Center for Eco-Environmental Sciences
Chinese Academy of Sciences, PR China

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

About the venue: Cancun and IMRC

(Excerpts from the IMRC's official site)

Resting on the northeast corner of the Yucatan Peninsula in the state of Quintana Roo (keen-tah-nah-ROW), Cancun was a part of the ancient Mayan civilization and is still considered the gateway to El Mundo Maya (the Mayan World).

Cancun has the distinction of being the one Caribbean destination with the infrastructure, modern amenities (spruced up in 2006) and service philosophy to rival leisure destinations worldwide.

Unlike many other parts of the Caribbean and Mexico, Cancun was built for tourism, and continues to meet the needs of its over 3.3 million annual visitors. Cancun delivers to travelers the best of many worlds: the Caribbean and Mexico; modern and ancient; action packed and laid back.

Cancun is unequaled in its ability to offer cultural treasures, natural beauty, infinite activities and North American-style conveniences. Resting on the northeast corner of the state of Quintana Roo (keen-tah-nah-row), Cancun was a part of the ancient Mayan civilization and is still considered the gateway to The Mayan World.

The Sociedad Mexicana de Materiales (SMM) will be hosting the XXVI International Materials Research Congress (IMRC 2017) in Cancún, México, August 20-25, 2017.

In this series of annual meetings, the SMM, in partnership with the MRS, offers an exciting multidisciplinary stage to present new directions in materials research and technology, as well as valuable opportunities to exchange ideas with some of the foremost experts in the field.

The IMRC has become a leading conference with about 1,800 attendees from more than 40 countries. We are sure that the IMRC 2017 you will find a wide range of symposium topics of interest to the materials research community at large.

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Participants

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2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Prof, Guibin JIANG

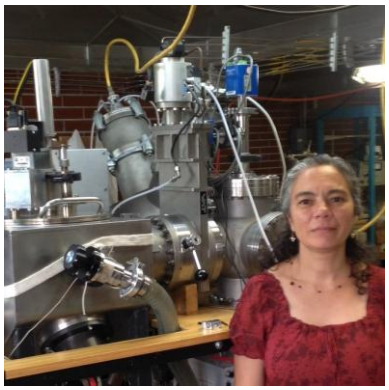
State Key Laboratory of environmental chemistry and ecological toxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences. 8 Shuangqing Road, Haidian Disctrict, Beijing, China
Tel. (86) 10 62849129
E-mail: lghu@rcees.ac.cn

Prof. Guibin Jiang received his Ph.D. from the Research Center for Eco- Environmental Sciences of the Chinese Academy of Sciences in 1991. He is now the director of the institute and director of the State Key Laboratory of Environmental Chemistry and Ecotoxicology. From January 2006, he was formally appointed the Associate Editor of Environmental Science and Technology (ES&T). He was elected as an academician of the Chinese Academy of Sciences in 2009, fellow of the Third World Academy of Sciences (TWAS) in 2012, and fellow of the Royal Society of Chemistry (FRSC) in 2014. Prof. Jiang′s research is mainly focused on environmental analytical chemistry and toxicology, including analytical development, environmental characterization and toxicity of persistent organic pollutants (POPs), organometallic compounds and nano- materials. He has contributed more than 600 papers in peer-reviewed scientific journals. He also contributed to the implementation of the Stockholm Convention on Persistent Organic Pollutants in China and identified some new POPs in the Chinese environment. In recognition of his research on the analytical methodology, distribution, accumulation and toxicity of POPs, he was honored with International Exchange Award of Japan Society on Water Environment in 2003, the prestigious Chang Jiang Scholars Achievement Award of China‟s Ministry of Education in 2007, National Award of Natural Science of State Council of PRC in 2003 and 2011, Agilent Thought Leader Award in 2013, and Outstanding Science and Technology Achievement Prize of Chinese Academy of Sciences in 2013.

Five selected publications:

[1] Lu, D. W.; Liu, Q.; Zhang, T. Y.; Cai, Y.; Yin, Y. G.; Jiang, G. B., Stable silver isotope fractionation in the natural transformation process of silver nanoparticles. *Nat Nanotechnol, 11*, (8), 682-686. (2016)
[2] Yongguang Yin, Yanbin Li, Chao Tai, Yong Cai, Guibin Jiang. Fumigant methyl iodide can methylate inorganic mercury species in natural waters. Nature Communications, 5, 4633. (2014).
[3] Chang Wang, Thanh Wang, Wei Liu, Ting Ruan, Qunfang Zhou, Jiyan Liu, Aiqian Zhang, Bin Zhao, Guibin Jiang. The in Vitro Estrogenic Activities of Polyfluorinated Iodine Alkanes. Environmental Health Perspectives, 120, 119-125. (2012)
[4] Liu Qian, Shi Jianbo, Sun Jianteng, Thanh Wang, Zeng Lixi, Jiang Guibin. Graphene and Graphene Oxide Sheets Supported on Silica as Versatile and High-Performance Adsorbents for Solid-Phase Extraction. Angewandte Chemie-International Edition, 50, 5913-5917. (2013)
[5] Guangbo Qu, Jianbo Shi, Thanh Wang, Jianjie Fu, Zhuona Li, Pu Wang, Ting Ruan, and Guibin Jiang. Identification of Tetrabromobisphenol A Diallyl Ether as an Emerging Neurotoxicant in Environmental Samples by Bioassay-Directed Fractionation and HPLC-APCI-MS/MS. Environmental Science & Technology, 45, 5009-5016. (2011)

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology



Dr. Sandra E. Rodil

Instituto de Investigaciones en Materiales
Universidad Nacional Autónoma de México
Ciudad Universitaria, Ciudad de México
Tel. (+52 55) 56224734
Fax. (+52 55) 56161251
E-mail: srodil@unam.mx
Personal website: https://plasnamatunam.wordpress.com/

Dr. Rodil holds a degree in physics from the Universidad Nacional Autónoma de México, UNAM, where she also obtained the degree of Master of Science (materials) obtaining the merit Alfonso Caso medal. She received her Ph.D. at the Department of Engineering of the University of Cambridge in 2001. In March 2001, she joined the Instituto de Investigaciones en Materiales (Material's Research Institute, IIM) of the UNAM as an associate researcher. Rodil is currently a full professor at the IIM. She has been award with two medals from the UNAM; the Sor Juana Inés de la Cruz (Distinguished women) in 2009 and the Fernando de Alba (Experimental Physics) in 2014.

Rodil`s research interests are focused on the synthesis and application of coatings or thin films deposited by plasma-assisted methods. As a Materials scientist, she found exciting the opportunities offered by the non-thermodynamic conditions of the plasma to synthesize materials presenting amorphous or crystalline phases that are not attainable under thermodynamic conditions. The applications include surface modification of biomaterials, hard and resistant coatings, photoactive coatings for photocatalysis and water splitting processes. Rodil's group (PLASNAMAT) is mainly conformed by postgraduate students, which keep alive the different research lines. She has graduated 13 PhD and about 19 master's students and published more than 110 articles, 17 papers in proceedings and eight book chapters.

Last publications:

1. Optical properties of nanocrystalline La2O 3 dielectric films deposited by radio frequency magnetron sputtering, SB Brachetti-Sibaja, SE Rodil, MA Domínguez-Crespo, AM Torres-Huerta, E Rodríguez, AB López-Oyama, Thin Solid Films 636, 615-621 (2017)
2. Preferential orientation in bismuth thin films as a function of growth conditions, S.E. Rodil, O. Garcia-Zarco, E. Camps, H. Estrada, M. Lejeune, L. Bourja, A. Zeinert, Thin Solid Films 636, 384-391 (2017)
3. Comparison of the osteogenic, adipogenic, chondrogenic and cementogenic differentiation potential of periodontal ligament cells cultured on different biomaterials, CC Barrera-Ortega, L Hoz-Rodríguez, H Arzate, A Fonseca-García, J Pérez-Alvarez, SE Rodil, Materials Science and Engineering: C 76, 1075-1084 (2017)
4. Synthesis and properties of Bi 5 Nb 3 O 15 thin films prepared by dual co-sputtering, Osmary Depablos-Rivera, Juan C Medina, Monserrat Bizarro, Ana Martínez, Andreas Zeinert, Sandra E Rodil, Journal of Alloys and Compounds 695, 3704-3713 (2017)
5. Enhancing the osteoblastic differentiation through nanoscale surface modifications, Phaedra Silva Bermudez, Argelia Almaguer Flores, Victor I Garcia, Rene Olivares Navarrete, Sandra E Rodil, Journal of Biomedical Materials Research Part A 105 (2), 498-509 (2017)

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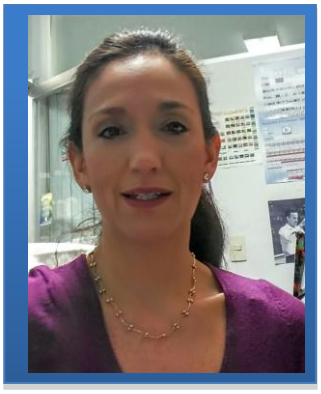

Iliana E. MEDINA-RAMIREZ

Chemistry Department/Center of Basic Sciences/Organometallic and Materials Chemistry Lab, Universidad Autónoma de Aguascalientes, Aguascalientes, Mexico.
Tel. (052) 449 910 8414
Fax. (052) 449 910 8401
E-mail: iemedina@correo.uaa.mx

Iliana E. Medina-Ramírez got her PhD in chemistry (organometallic and materials chemistry) from Tulane University in 2005. She has more than 10 years of research experience in the field of nano-structured materials (metallic, metal oxides and metal-chalcogenides), with particular interest in photocatalytic materials for environmental remediation and biomedical applications. She has published 56 papers in internationally peer review journals, 4 book chapters and is the co-editor of the book "Photocatalytic Semiconductors. Synthesis, characterization and environmental applications" Springer (Ed), She has participated in more than 20 international conferences. She has supervised 45 BSc students, 10 MSc students and 6 doctorate students. She was awarded the best junior researcher prize (2007) and advanced researcher award (2nd place, 2011) at her current academic institution. She is a member of the System of National Researchers (Mexico) and co-organizer of the Mexico-China Workshop on Renewable Energy and Environment Remediation.

Three to Five selected publications:

[1] "Photocatalytic Semiconductors. *Synthesis, Characterization and Environmental Applications*" Aracely Hernández-Ramírez and Iliana Medina-Ramirez (Eds.) Springer, 2015 (ISBN 978-3-319-10999-2).

[2] Aba-Guevara, C. G., Medina-Ramírez, I. E., Hernández-Ramírez, A., Jáuregui-Rincón, J., Lozano-Álvarez, J. A., & Rodríguez-López, J. L. (2017). Comparison of two synthesis methods on the preparation of Fe, N-Co-doped TiO 2 materials for degradation of pharmaceutical compounds under visible light. *Ceramics International*, *43*(6), 5068-5079.

[3] Garcidueñas-Piña, C., Medina-Ramírez, I. E., Guzmán, P., Rico-Martínez, R., Morales-Domínguez, J. F., & Rubio-Franchini, I. (2016). Evaluation of the Antimicrobial Activity of Nanostructured Materials of Titanium Dioxide Doped with Silver and/or Copper and Their Effects on Arabidopsis thaliana.*International Journal of Photoenergy*, *2016*.

[4] I Medina-Ramirez, Z Luo, S Bashir, R Mernaugh, JL Liu. Facile design and nanostructural evaluation of silver-modified titania used as disinfectant (2011). *Dalton Transactions* 40 (5), 1047- 1054.

[5] X Pan, I Medina-Ramirez, R Mernaugh, J Liu. Nanocharacterization and bactericidal performance of silver modified titania photocatalyst (2010). *Colloids and Surfaces B: Biointerfaces* 77 (1), 82- 89.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Juan Antonio Zapien

Associate Professor
Department of Materials Science and Engineering
City University of Hong Kong, Hong Kong, SAR PRC
Tel. (852) 3442 7823
Fax. (852) 3442 0547
E-mail: apjazs@cityu.edu.hk

Antonio was born in Morelia the capital of the Michoacán state in México. He studied Physics at the National Autonomous University of Mexico (UNAM). After a short research exchange in the UK he started his doctoral studies at The Pennsylvania State University (Penn State, USA) receiving his PhD degree in December 2000 for his work in the Optical Characterization of the Nucleation and Growth of Wide Bandgap Materials under the Co-Supervision of Prof. Russell Messier and Prof. Robert Collins. He lives in Hong Kong since 2002 and his current research interests include optical characterization of nanostructures for plasmonic and photonic applications, energy generation and storage, light emission, and optical sensors. He has co-authored three book chapters and ~ 130 publications indexed in SCI who have received more than 4300 citations with h-index 34 (Google Scholar 5,400 citations, h-index 36). He has participated as invited speaker in more than 30 international conferences and is involved as organizer of several workshops and scientific conferences in Mexico, the United States and Hong Kong. Antonio is the main organizer of NANOMXCN: Mexico-China Workshop on Nano Materials / Science / Technology (www.nanomxcn.com) aseries of workshops with the main objective of promoting scientific and technological collaboration between Mexico and China, including Hong Kong.

Selected publications:

[1] Y. Foo, JA Zapien "Convergence and precision characteristics of finite difference time domain method for the analysis of spectroscopic ellipsometry data at oblique incidence" *Appl. Surf. Sci. In Pres Avail. Online* https://doi.org/10.1016/j.apsusc.2016.12.165.

[2] YC Dong, YS Chui, X Yang, RG Ma, JM Lee, JM JA Zapien, "Facile Synthesis of Hollow Mesoporous CoFe2O4 Nanospheres and Graphene Composites as High-Performance Anode Materials for Lithium-Ion Batteries" *CHEMELECTROCHEM* **2** (2016) 1010.

[3] T. Wood, K. T. Cheung, Y. Foo, Y. K. Liu & J. A. Zapien "Resonance modulated amplified emission from CdSSe nanoribbons" *Scientific Reports* **5** (2015) 15071. DOI: 10.1038/srep15071 (online October 2015).

[4] CH To, A Ng, Q Dong, AB Djurišić, JA Zapien, Wai Kin Chan, C Surya, "Effect of PTB7 Properties on the Performance of PTB7:PC71BM Solar Cells" ACS *Appl. Mater. Interfaces* **7** (2015), 13198−13207.

[5] S. Jha, J.-C. Qian, O. Kutsay, J. Kovac Jr, C.-Y. Luan, J. A. Zapien, W. Zhang, S.T. Lee and I. Bello "Violet-blue LEDs based on p-GaN/n-ZnO nanorods and their stability" *Nanotechnol* **22**, 245202 (2011), doi:10.1088/0957-4484/22/24/245202.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Director, Hao ZHU

Division of Science and Technology of the Embassy of the People's Republic of China in Mexico, Representative of Ministry of Science and Technology of China in Mexico.
Av. San Jerónimo 217B, Álvaro Obregón, La Otra Banda, 01090
Ciudad de México, México
Tel. (52) 55 56160609 ext.111
E-mail: zhuh2016@hotmail.com, zhuh@most.cn

Hao ZHU is currently the director for science and technology of the Embassy of the People's Republic of China in Mexico. He is responsible for the exchange and cooperation matters in science, technology and innovation between the governments of China and Mexico. He graduated from Shandong University in 2007 and received his Master's Degree in mechanical engineering and automation from the Department of Precision Instruments and Mechanics of Tsinghua University in 2010. He worked for the Ministry of Science and Technology of China to carry out scientific and technological innovation policy research and national science and technology plan management such as 863 Program, National Key Technologies R&D Program, etc. Funded by the China Scholarship Council, he has been a visiting scholar in National Autonomous University of Mexico (UNAM) for one year between 2014 and 2015.

He hoped that scientists from China and Mexico will continue to promote cooperation actively in the field of STI between China and Mexico and he would like to create favorable conditions for the cooperation. The Embassy of the People's Republic of China welcomes the great contribution of the two countries' scientists to improve Sino-Mexican bilateral relations.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Leo W.M. LAU

Center for Green Innovation, University of Science & Technology Beijing
Tel. (86) 186 0282 2605
E-mail:leolau@ustb.edu.cn

Professor Lau is a National Thousand Talents Awardee in China, and currently leads the Center for Green Innovation, University of Science & Technology Beijing as its founding director. He has worked on R&D relevant to nanomaterials and nanotechnology, surface science and engineering, and green energy/chemistry. Professor Lau is particularly keen on advocating practical applications of research results. In this aspect, he is currently developing projects on fundamental studies of energy-conversion mechanisms, green chemistry driven by reactant's kinematics, photovoltaic module manufacturing, distributed PV engineering, and green-town planning in China. Professor Lau was born in China and grew up in Hong Kong. He developed his career in Canada and then returned to Hong Kong where he served the Chinese University of Hong Kong as Chair Professor of Materials Science, Head of Physics Department, and Dean of Science Faculty. In 2005, he returned to Canada again to direct Surface Science Western, a research center excelling in university-industry collaboration. In 2010, he moved back to China, with his main focus on novel and practical green energy and manufacturing technologies, and on training highly qualified personnel in these fields. Professor Lau has published some 400 articles, invented some 60 patented or patent-pending technologies, and founded 5 high-tech startups.

Examples of research outputs by Professor Lau and his coworkers:

"Cross-linking the surface of cured polydimethylsiloxane via hyperthemal hydrogen projectile bombardment", **ACS Appl. Mater. Interf.** 7, 8515-8524(2015)

"Electrodeposited CZTS solar cells from Reline electrolyte", **Green Chem.** 16, 841-3845(2014)

"Cleaving C-H bonds with hyperthermal H_2: facile chemistry to cross-link organic molecules under low chemical- and energy-loads", **Green Chem.** 16, 1316-1325 (2014)

"Shewanella oneidensis MR-1 bacterial nanowires exhibit p-type, tunable electronic behavior ", **Nano Lett**. 13, 2407-2411(2013)

"Grafting of polyelectrolytes onto hydrocarbon surfaces by high-energy hydrogen induced cross-linking for making metallized polymer films", **Chem. Comm.** 49, 4658-4660 {2013)

"Resolving surface chemical states in XPS analysis of first row transition metals, oxides and hydroxides: Cr, Mn, Fe, Co and Ni", **Appl. Surf. Sci.** 257, 2717-2730(2011) {cited some 600 times}

"Electrical transport along bacterial nanowires from Shewanella Oneidensis MR-1", **Proc. Nat. Acad. Sci.** 107, 18127-18131(2010)

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor Dr. Federico Rosei
INRS Centre for Energy, Materials and Telecommunications, 1650 Boul. Lionel Boulet, J3X 1S2 Varennes (QC) Canada
Tel. (514) 2286906
E-mail: rosei@emt.inrs.ca
Personal website: www.nanofemtolab.qc.ca

Federico Rosei is Professor and Director of Institut National de la Recherche Scientifique, Énergie, Matériaux et Télécommunications, Université du Québec, Varennes (QC) Canada. Since January 2014 he holds the UNESCO Chair in Materials and Technologies for Energy Conversion, Saving and Storage and since May 2016 he also holds the Canada Research Chair (Senior) in Nanostructured Materials. He received MSc and PhD degrees from the University of Rome "La Sapienza" in 1996 and 2001, respectively.

Dr. Rosei's research interests focus on the properties of nanostructured materials, and on how to control their size, shape, composition, stability and positioning when grown on suitable substrates. He has extensive experience in fabricating, processing and characterizing inorganic, organic and biocompatible nanomaterials. He has published over **250** articles in prestigious international journals (including *Science*, *Nature Photonics*, *Proc. Nat. Acad. Sci.*, *Adv. Mater.*, *Angew. Chem.* Int. Ed., *J. Am. Chem. Soc.*, *Adv. Func. Mater.*, *Nanolett.*, *ACS Nano*, *Biomaterials*, *Small*, *Phys. Rev. Lett.*, *Nanoscale*, *Chem. Comm.*, etc.), has been invited to speak at over **260** international conferences and has given over **200** seminars and colloquia, over **50** professional development lectures and **35** public lectures in **42** countries on all inhabited continents. His publications have been cited >**8500** times, H index is **50**.

He is Fellow of numerous prestigious national and international societies and academies, including: the Royal Society of Canada, the European Academy of Sciences, the World Academy of Art and Science, the American Physical Society, the American Association for the Advancement of Science, SPIE, the Canadian Academy of Engineering, ASM International, the Royal Society of Chemistry (UK), the Institute of Physics, the Institution of Engineering and Technology, the Institute of Materials, Metallurgy and Mining, the Engineering Institute of Canada, the Australian Institute of Physics, Honorary Fellow of the Chinese Chemical Society, Foreign Member of the Mexican Academy of Engineering and Senior Member of IEEE.

He has received several awards and honours, including the FQRNT Strategic Professorship (2002–2007), the Tan Chin Tuan visiting Fellowship (NTU 2008), the Senior Gledden Visiting Fellowship (UWA 2009), Professor at Large at UWA (2010–2012), a FW Bessel Award (Alexander von Humboldt foundation 2011), the Rutherford Medal in Chemistry (Royal Society of Canada 2011), the Herzberg Medal (Canadian Association of Physics 2013), the Brian Ives lectureship award (ASM international 2013), the Award for Excellence in Materials Chemistry (Canadian Society for Chemistry 2014), the NSERC EWR Steacie Memorial Fellowship (2014), the José Vasconcelos Award for Education (World Cultural Council 2014), the IEEE NTC Distinguished Lectureship 2015, the Lash Miller Award (Electrochemical Society 2015), the Chang Jiang Scholar Award (Government of China), the Khwarizmi International Award (Government of Iran), the Recognition for Excellence in Leadership (American Vacuum Society), the Selby Fellowship (Australian Academy of Sciences), the John C. Polanyi Award (Canadian Society for Chemistry 2016), the Outstanding Engineer Award (IEEE Canada 2017) and the Sigma Xi Distinguished Lectureship (2018–2020).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Bing YAN

Shandong University, Jinan, China 250100
Tel. (531) 8838 0019
Fax: (531) 8838 0029
Email: drbingyan@yahoo.com
Personal website: www.yanlab.net

Bing Yan got his Ph.D. from Columbia University in 1990 and did postdoctoral research at University of Cambridge and University of Texas Medical School in Houston from 1990 to 1993. He carried out drug discovery research from 1999 to 2005 and then entered academia. He served as an editorial board member and then Associate Editor for "Journal of Combinatorial Chemistry (now ACS Combinatorial Sciences)" published by ACS from 1999 to 2011. He is now Associate Editor for Elsevier's new journal "NanoImpact". He has published 10 books and more than 210 peer-reviewed papers.

Five selected publications:

[1] Mu, Q.X., Du, G.Q., Chen, T.S., Zhang, B., Yan, B. Suppression of Human Bone Mophorgenetic Protein (BMP) Signaling by Carboxylated Single-Walled Carbon Nanotubes. ACS Nano 2009, 3, (5), 1139-1144.

[2] Mu, Q.X., Jiang, G.B., Chen, L., Zhou, H., Fourches, D., Tropsha, A., Yan, B. Chemical Basis of Interactions Between Engineered Nanoparticles and Biological Systems. Chemical Reviews.2014; 114(15):7740-7781.

[3] Zhang, Y., Bai, Y.H., Jia, J.B., Gao, N.N., Li, Y., Zhang, R.N., Jiang, G.B., Yan, B. Perturbation of Physiological Systems by Nanoparticles. Chem. Soc. Rev. 2014, 43, 3762-3809.

[4] Bai, Y.H., Zhang, Y., Zhang, J.P., Mu, Q.X., Zhang, W.D., Butch, E., Snyder, S., Yan, B. Repeated carbon nanotube administrations in male mice cause reversible testis damage without affecting fertility. Nature Nanotechnology, 2010, 5(9), 683-689.

[5] Zhou, H., Mu, Q., Gao, N., Liu, A., Xing, Y., Gao, S., Zhang, Q., Qu, G., Chen, Y., Liu, G., Zhang, B., Yan. B. A Nano-Combinatorial Library Strategy for the Discovery of Nanotubes with Reduced Protein-Binding, Cytotoxicity, and Immune Response, Nano Lett. 2008, 8 (3), 859-865.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Gerko OSKAM

Department of Applied Physics
Center of Research and Advanced Studies (Cinvestav)
Antigua Carretera a Progreso km 6
Mérida, Yucatán 97310, México.
Tel. 52 (999) 9429429
Fax. 52 (999) 9812917
E-mail: gerko.oskam@cinvestav.mx
http://www.mda.cinvestav.mx/personal/goskam.htm

Dr. Gerko Oskam obtained his doctorate degree in chemistry from the Universiteit Utrecht (The Netherlands) in 1993 under supervision of Dr. John J. Kelly and Dr. Daniel Vanmaekelbergh. From 1993 to 2001, he worked in the Department of Materials Science and Engineering at the Johns Hopkins University (Baltimore, MD, USA), first as a post-doc then as an associate research scientist, under the supervision of Dr. Peter C. Searson. Since 2001, Dr. Oskam is a Professor in the Department of Applied Physics at CINVESTAV-IPN. Current research interests are focused on three main topics, all related to the conversion of solar energy: (i) Dye-sensitized solar cells: synthesis and characterization of functional metal oxide nanomaterials, novel dyes and redox couples; electron transport and recombination mechanisms; hybrid perovskite solar cells. (ii) Photoelectrochemical hydrogen generation: novel materials; small perturbation electrochemical methods. (iii) Solar-to-thermal energy conversion: selective coatings by sputtering and electrochemical deposition.
He has served as an Associate Editor of the journals Science of Advanced Materials (2008-2012) and Journal of the Mexican Chemical Society (2014 - present), and was the Academic Coordinator of the Department of Applied Physics from 2009-2015. He is a recipient of the Elsevier Scopus Award Mexico 2011. Dr. Oskam has graduated >20 PhD and MSc students and has published >80 articles, which have received >3,500 citations, with an h-index of 32. He has published several book chapters and holds two US patents.

Five selected publications:

[1] Influence of a metallic nickel interlayer on the performance of solar absorber coatings based on black nickel electrodeposited onto copper. M.A. Estrella-Gutiérrez, F.I. Lizama-Tzec, O. Arés-Muzio and G. Oskam, *Electrochim. Acta* **213**, 460-468 (2016).
[2] The effect of recombination under short-circuit conditions on the determination of charge transport properties in nanostructured photoelectrodes. J. Villanueva-Cab, J. A. Anta, and G. Oskam. *Phys. Chem. Chem. Phys.* **18**, 2303-2308 (2016).
[3] Photoelectrochemical water oxidation at electrophoretically deposited WO3 films as a function of crystal structure and morphology. M. Rodríguez-Pérez, C. Chacón, E. Palacios-González, G. Rodríguez-Gattorno and G. Oskam, *Electrochim. Acta* **140**, 320-331 (2014).
[4] Charge separation at disordered semiconductor heterojunctions from random walk numerical simulations. H.J. Mandujano-Ramírez, J.P. González-Vázquez, G. Oskam, T. Dittrich, G. Garcia-Belmonte, I. Mora- Seró, J. Bisquert and J.A. Anta. *Phys. Chem. Chem. Phys*. **16**, 4082-4091 (2014).
[5] Phase-pure TiO2 nanoparticles: anatase, brookite and rutile. D. Reyes-Coronado, G. Rodríguez-Gattorno, M.E. Espinosa-Pesqueira, C. Cab, R. de Coss, and G. Oskam, *Nanotechnology* **19**, 145605 (10 pp) (2008)

Prof. Yan Li

College of Chemistry and Molecular Engineering
Peking University, Beijing 100871, China.
Tel. +86-10-62756773
Fax. +86-10-62755357
E-mail: yanli@pku.edu.cn
Personal website: http://www.chem.pku.edu.cn/page/liy/liyan.html

Yan Li graduated from Shandong University with a Bachelor's degree in chemistry in 1987 then received her Ph.D in inorganic chemistry from Peking University in 1993. After two years' postdoctoral research, she joined the faculty of Chemistry, Peking University in 1995. From 1999 to 2001, she was a visiting Associate Professor at Duke University. She has been the full professor of chemistry at Peking University since 2002. She won National Outstanding Youth Fund of China in 2011 and was awarded as Chang Jiang Scholar by Chinese Ministry of Education in 2014. She is also appointed as a distingguished visiting professor in The University of Tokyo since 2016. She is a fellow of Royal Society of Chemistry. Her research is focused on carbon nanomaterials, especially the preparation, modification, characterization and application of carbon nanotubes. She has published more than 140 papers in peer-rviewed journals. Her research on chirality-specified growth of single-walled carbon nanotubes was listed as Top 10 Chemical Research in 2014 by Chemical & Engineering News. Currently, she is serving as the associated editor for ACS Nano and on the advisory boards of Materials Horizons and Journal of Materials Chemistry A. She is also serving in several other organizations such as the MRS award nomination sub-committee.

Selected publications:

[1] Yang, F.; Wang, X.; Li, M. H.; Liu, X. Y.; Zhao, X. L.; Zhang, D. Q.; Zhang, Y.; Yang, J.; Li, Y, *Accounts of Chemical Research*, 49, 606-615 (2016).
[2] Yang, F.; Wang, X.; Zhang, D.; Yang, J.; Luo, D.; Xu, Z.; Wei, J.; Wang, J.-Q.; Xu, Z.; Peng, F.; Li, X.; Li, R.; Li, Y.; Li, M.; Bai, X.; Ding, F.; Li, Y, *Nature*, 510, 522-524 (2014).
[3] Yang, F.; Wang, X.; Zhang, D.; Qi, K.; Yang, J.; Xu, Z.; Li, M.; Zhao, X.; Bai, X.; Li, Y, *Journal of the American Chemical Society*, 137, 8688-8691 (2015).

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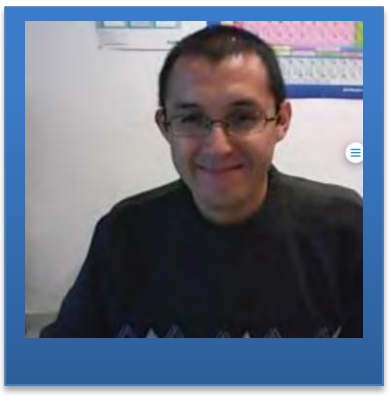

Juan Manríquez Rocha

Research Department
Centro de Investigación y Desarrollo Tecnológico en Electroquímica S.C
E-mail: jmanriquez@cideteq.mx

Juan Manríquez-Rocha obtained a PhD in electrochemistry (functional modified electrodes) from Centro de Investigación y Desarrollo Tecnológico en Electroquímica S.C (CIDETEQ, 2007). He has 14 years of research experience on functional modified electrodes for applications in electrochemistry photovoltaics, electrocatalysis and electrochemical detectors, having particular interest in dye-sensitized solar cells, electrochemical generation of H2 from urea oxidation and amperometric detectors of biological metabolites. He has published about 37 papers in internationally peer-reviewed journals, 6 co-edited chapters of books. He has directed 20 theses distributed as follows: 5 PhD theses, 8 MSc theses and 7 BSc theses. He was awarded The Best Theses on Electrochemistry by The Mexican Electrochemical Society (2nd place at BSc category, 1999; 1st place at MSc category, 2003). He was selected as Coordinator of the Posgraduate on Science and Technology (specialty on Environmental Engineering) from March 15th, 2011 to April 12nd, 2012; and later as Subdirector of Postgraduate Studies from April 13rd, 2012 to May 15th, 2013; both in CIDETEQ. He is member of the National System of Researchers at category II.

Selected Publications

1. "Electrocatalysis of the oxidation of alcohol and phenol derivates pollutants at vitreous carbon electrode coated by nickel macrocyclic complex-based films" J. Manriquez, J.L. Bravo, S. Gutierrez-Granados, S. Sucar Succar, C. Bied-Charreton, A.Alatorre Ordaz, F.Bedioui; Anal. Chim. Acta, 378 (1999) 159-168.

2. "QCM Study of the Aggregation of Starburst PAMAM Dendrimers on the Surface of Bare and Thiol-Modified Gold Electrodes" J. Manríquez, E. Juaristi, O. Muñoz-Muñiz, Luis A. Godínez; Langmuir, 19 (2003) 7315-7323.

3. "Ni(II) 1,4,8,11-tetraazacyclotetradecane Electrocatalytic Films Prepared on Top of Surface Anchored PAMAM Dendrimers Layers. A New Type of Electrocatalytic Material for the Electrochemical Oxidation of Methanol" Miguel A. González-Fuentes, J. Manríquez, S. Gutiérrez-Granados, A. Alatorre-Ordaz, Luis A. Godínez; Chem. Commun. (2005) 898-900.

4."Design, Self-Assembly, and Photophysical Properties of Pentameric Metallomacrocycles:[M5(N-hexyl[1,2-bis(2,2':6',2"-terpyridin-4-yl)]carbazole$_5$] [M= Fe(II), Ru(II), and Zn(II)]" Seok-Ho Hwang, Charles N. Moorefield, Luis A. Godínez, Juan Manríquez, Erika Bustos and George R. Newkome. Chem. Commun., 2005, 4672-4674.

5. "Tuning the Structural, Electrical and Optical Properties of Ti(III)-Doped Nanocrystalline TiO2 Films by Electrophoretic Deposition Time" J. Manríquez, Luis A. Godínez; Thin Solid Films 515 (2007) 3402-3413.

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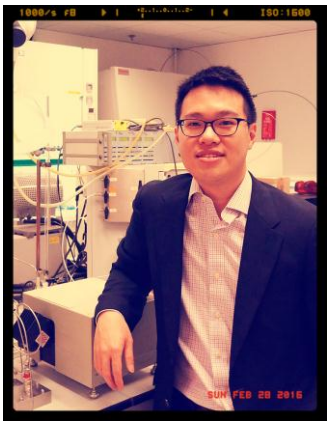

Associate Professor Wey Yang TEOH

Clean Energy and Nanotechnology (CLEAN) Laboratory, School of Energy and Environment, City University of Hong Kong, Kowloon, Hong Kong S.A.R.
Tel. (852) 3442 4627
E-mail: wyteoh@cityu.edu.hk
Personal website:
http://www.cityu.edu.hk/see/personal/WY_Teoh.htm

Wey Yang TEOH is tenured Associate Professor at the School of Energy and Environment, City University of Hong Kong, where he heads the Clean Energy and Nanotechnology (CLEAN) Laboratory. He is also an Associate Editor of the Frontiers in Materials (Nanoenergy Technologies and Materials). His research is dedicated to the fundamentals of heterogeneous thermal- and photocatalysis, and particularly in solving various Energy and Environmentally-related problems. To do so, he and his group establish new strategies for rational catalysts design based on the photocharge transport, surface molecular catalysis, and photochemical conversions. In recognition of his contribution, he received a number of awards including the more recent Joseph Wang Award for Young Scientist in Nanomaterials 2016. His research has been funded by national funding bodies such as the Australian Research Council and Research Grant Council of Hong Kong. His work is published in various journals including Adv. Funct. Mater., ACS Nano, ChemSusChem, Small, Chem. Mater., J. Phys. Chem. and J. Catal. He also serves on the Scientific Board of HeiQ AG, a leading Swiss innovator in textiles.

Three to Five selected publications:

[1] Hu, C., Kelm, D., Schreiner, M., Wollborn, T., Mädler, L., Teoh, W.Y.,* "Designing photoelectrodes for photocatalytic fuel cells and elucidating the effects of organic substrates" *ChemSusChem* 8 (2015) 4005

[2] Gong, X., Liu, G., Li, Y., Yu, Y.W.D., Teoh, W.Y.,* "Functionalized-graphene composites: Fabrication and applications in sustainable energy and environment" *Chem. Mater.* 28 (2016) 8082.

[3] Xu, F., Chen, J., Kalytchuk, S., Chu, L., Shao, Y., Kong, D., Chu, K.H., Sit, P.H.-L., Teoh, W.Y.,* "Supported gold clusters as effective and reusable photocatalysts for the abatement of endocrine disrupting chemicals under visible light" *J. Catal.* (2017) *in press*.

[4] Yang, H., Fan, W., Vaneski, A., Susha, A.S., Teoh, W.Y.,* Rogach, A.L., "Heterojunction engineering of CdTe and CdSe quantum dots on TiO_2 nanotube arrays: Intricate effects of size-dependency and interfacial contact on photoconversion efficiencies" *Adv. Funct. Mater.* 22 (2012) 2821

[5] Teoh, W.Y., Scott, J., Amal, R., "Evolutionary progress of heterogeneous photocatalysis: From classical radical chemistry to engineering nanomaterials and solar reactors" *J. Phys. Chem. Lett.* 3 (2012) 629.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Yuchao Yang

Institute of Microelectronics, Peking University, Beijing China
Tel. +86-10-62752082
Fax. +86-10-62752082
E-mail: yuchaoyang@pku.edu.cn
Personal website:
http://www.ime.pku.edu.cn/newsshow.php?id=65&cid=177

Yuchao Yang received Ph.D. degree from Tsinghua University in 2011. After that he joined University of Michigan, Ann Arbor, MI, USA as a postdoctoral Research Fellow and was promoted to Senior Research Fellow in 2013. He is now an Assistant Professor in Institute of Microelectronics, Peking University. He was a recipient of the "1000 Youth Talents Program" of China and the Qiu Shi Outstanding Young Scholar Award. His research interests include neuromorphic computing, memristive devices and nanoionics. He has published >50 papers in high-profile journals such as Nature Communications, Advanced Materials, Nano Letters, Advanced Functional Materials, etc. and 3 book chapters. His papers have been cited over 2900 times, with an h-index of 22. He was invited to give 9 keynote/invited talks on international conferences and serve as technical program committee member for 3 international conferences. He is a member of IEEE, MRS, RSC and ACS.

Selected publications:

[1] Yuchao Yang, Xiaoxian Zhang, Liang Qin, Qibin Zeng, Xiaohui Qiu & Ru Huang, *Probing Nanoscale Oxygen Ion Motion in Memristive Systems*. *Nature Commun.* **8**, 15173 (2017).
[2] Yuchao Yang, Peng Gao, Linze Li, Xiaoqing Pan, Stephan Tappertzhofen, Shinhyun Choi, Rainer Waser, Ilia Valov, and Wei D. Lu, *Electrochemical dynamics of nanoscale metallic inclusions in dielectrics*. *Nature Commun.* **5**, 4232 (2014).
[3] Yuchao Yang, Peng Gao, Siddharth Gaba, Ting Chang, Xiaoqing Pan, and Wei Lu, *Observation of Conducting Filament Growth in Nanoscale Resistive Memories*. *Nature Commun.* **3**, 732 (2012).

Prof. Xiaohui QIU

National Center for Nanoscience and Technology, China Beijing, 100190, China.
Tel. (86) 82545583
E-mail: xhqiu@nanoctr.cn
Personal website: www.nanoctr.cas.cn/qiuxiaohui/shouye/

Prof. Xiaohui Qiu obtained his Ph.D. in 2000 from the Institute of Chemistry, CAS. He was a postdoctoral researcher at the University of California, Irvine, and a visiting scientist at IBM research center and Ohio State University, where he was actively involved in scanning tunneling microscopy with applications in single molecule vibrational spectroscopy and light emission. He joined NCNST as a principle investigator in 2006, and became the director of CAS Key Laboratory for Standardization and Measurement for Nanotechnology in 2013. He has coauthored 100 papers in peer-reviewed journals, a book and several book chapters. Prof. Qiu's research interests include (1) Scanning probe microscopy on single-molecule physics and chemistry. (2) Electrical and optical characterization of low-dimensional materials. He serves in the editorial board of Advanced Materials Interface, Advanced Electronic Materials, Surface Science, Small methods, and Review of Scientific Instruments.

[1] Meizhuang Liu, Mengxi Liu, Limin She, Zeqi Zha, Jinliang Pan, Shichao Li, Tao Li, Yangyong He, Zeying Cai, Jiaobing Wang, Yue Zheng, Xiaohui Qiu*,Dingyong Zhong*, Graphene-like nanoribbons periodically embedded with four- and eight-membered rings, Nature Communications **8**:14924, DOI: 10.1038/ncomms14924 (2017)

[2] Yuchao Yang*, Xiaoxian Zhang*, Liang Qin, Qibin Zeng, Xiaohui Qiu*, Ru Huang*, Probing nanoscale oxygen ion motion in memristive systems, Nature Communications **8**:15173, DOI: 10.1038/ncomms15173 (2017)

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr Francisco Javier Rodríguez Varela

Center for Research and Advanced Studies of the National Polytechnic Institute (Cinvestav), Ramos Arizpé Saltillo/Coahuila, Mexico
Tel. +52 (844) 438-9600 ext. 8526
javier.varela@cinvestav.edu.mx

Electrical Mechanical Engineer from the Autonomous University of Coahuila and Master in Solar Energy from the National Autonomous University of Mexico (UNAM). He is Ph. D diplomed at the École polytechnique de Montréal (2004) in Metallurgical Engineering, with emphasis in electrochemistry. Postdoctor in the same institution (2004-2005). He joined Cinvestav Unidad Saltillo in 2006, where he has been a principal investigator since 2009.
He has been a leader in several national and international projects funded by Conacyt and by the Conacyt-Secretariat of Economy Innovation Fund. President of the Mexican Hydrogen Society in the period 2012-2014 and General Coordinator of the Conacyt Hydrogen Thematic Network (2015). Member of the Advisory Board (2007 -). Guest Editor of the Journal of New Materials for Electrochemical Systems (2008 - 2013) and Guest Editor of the Journal of Applied Electrochemistry (2015). Member of the Organizing Committee of several national and international congresses. He is a member of Electrochemical Society, Mexican Society of Hydrogen, International Society of Electrochemistry, Mexican Society of Electrochemistry. He is also member of the College of Teachers of the Master of Science in Sustainability of Natural Resources and Energy, and of the Doctorate in Nanosciences and Nanotechnology. Both postgraduates of Cinvestav and with recognition of the PNPC.
His research areas include: hydrogen technologies, fuel cells, electrocatalysis, development of new energy materials, quantification and use of alternative energies. Author of 52 publications. He has conducted 2 doctoral theses (2 more in process), 6 master's degrees (4 more in process) and 6 bachelor's degrees (2 more in process). He has been co-editor of two books related to hydrogen technologies and author of 9 book chapters. Dr. Rodríguez Varela has given invited talks at various international and national events

Five selected publications:

1. A.A. Siller-Ceniceros, M.E. Sánchez-Castro, D. Morales-Acosta, J.R. Torres-Lubian, E. Martínez G., F.J. Rodríguez-Varela. Applied Catalysis B: Environmental, 209:455–467, 2017, DOI: 10.1016/j.apcatb.2017.03.023
2. Velumani Thiagarajan, Ramasamy Manoharan, Palaniswamy Karthikeyan, Eliyan Nikhila, A. Hernández Ramírez,F.J. Rodriguez-Varela. International Journal of Hydrogen Energy, 2017, DOI: 10.1016/j.ijhydene.2016.09.033.
3. W.J. Pech-Rodríguez, D. González-Quijano, G. Vargas-Gutiérrez, C. Morais, T.W. Napporn, F.J. Rodríguez-Varela. Applied Catalysis B: Environmental, 203;654–662, 2017, DOI: 10.1016/j.apcatb.2016.10.058
4. I.L. Alonso-Lemus, F.J. Rodriguez-Varela, M.Z. Figueroa-Torres, M.E. Sanchez-Castro, A. Hernandez- Ramírez, D. Lardizabal-Gutierrez, P. Quintana-Owen. International Journal of Hydrogen Energy, 41:23409–23416, 2016, DOI: 10.1016/j.ijhydene.2016.09.033.
5. D. Morales-Acosta, F.J. Rodríguez-Varela, R. Benavides. International Journal of Hydrogen Energy, 41:3387–3398, 2016, DOI: 10.1016/j.ijhydene.2015.10.114.

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Professor Xuefeng Guo

College of Chemistry and Molecular Engineering
Peking University, Beijing 100871, P.R. China.
Tel. 86-(10) 6275 7789
Fax. 86-(10) 6275 7789
E-mail : guoxf@pku.edu.cn
Personal website: http://www.chem.pku.edu.cn/guoxf/

Dr. Xuefeng Guo received his Ph.D. degree in Organic Chemistry in 2004 from the Institute of Chemistry, Chinese Academy of Science, Beijing. In 2006, he was awarded the National Top 100 Excellent Ph. D. Thesis Award in China. From 2004 to 2007, he was a joint postdoctoral scientist at the Columbia University Nanocenter, where he worked on single-molecule devices and device physics. He joined the faculty as a professor under "Peking 100-Talent" Program at College of Chemistry and Molecular Engineering, Peking University in January 2008. In 2012, he won the National Science Fund for Distinguished Young Scholars in China. In 2015, he was selected as the Ministry of Science and Technology Youth Science and Technology Innovation Leader in China.

His research interests are focused on single-molecule devices and device physics, flexible/organic electronics, single-molecule biodetection and dynamics, etc. He has over 130 scientific papers, including *Science*, *Chem. Rev.*, *Acc. Chem. Res.*, *Chem. Soc. Rev.*, *Nature Nanotechnol.*, *PNAS*, *JACS*, *Angew. Chem. Int. Ed. et. al*., and 16 patents.

Five selected publications:

1. Chuancheng Jia, Agostino Migliore, Na Xin, Shaoyun Huang, Jinying Wang, Qi Yang, Shuopei Wang, Hongliang Chen, Duoming Wang, Boyong Feng, Zhirong Liu, Guangyu Zhang, Da-Hui Qu, He Tian, Mark A. Ratner, H. Q. Xu*, Abraham Nitzan*, and Xuefeng Guo*, Covalently-bonded Single Molecule Junctions with Stable and Reversible Photoswitched Conductivity, *Science* **2016**, *352*, 1443. Highlighted by *Science* in the same issue and selected as one of *China Top Ten Scientific Progress* **2016**.
2. Dong Xiang, XIaolong Wang, Chuancheng Jia, Takhee Lee*, and Xuefeng Guo*, Molecular-Scale Electronics: From Concept to Function, *Chem. Rev.* **2016**, *116*, 4318. (Cover of this issue)
3. Chuancheng Jia, Bangjun Ma, Na Xin, and Xuefeng Guo*, Carbon Electrode-Molecule Junctions: A Reliable Platform for Molecular Electronics, *Acc. Chem. Res.* **2015**, 48, 2565. (Cover of this issue)
4. Chuancheng Jia and Xuefeng Guo*, Molecule-Electrode Interfaces in Molecular Electronic Devices, *Chem. Soc. Rev.* **2013**, *42*. 5642. (Cover of this issue)
5. Xuefeng Guo, Joshua P. Small, Jennifer E. Klare, Yiliang Wang, Iris Tam, Meninder S. Purewal, Byung Hee Hong, Robert Caldwell, Limin Huang, Stephen O'Brien, Jiaming Yan, Ronald Breslow, Shalom J. Wind, James Hone, Philip Kim, Colin Nuckolls, Covalently Bridging Gaps in Single-Walled Carbon Nanotubes with Conducting Molecules, *Science* **2006**, *311*, 356. "Nanotube Hookup", highlighted by *Scientific American*, April, **2006**.

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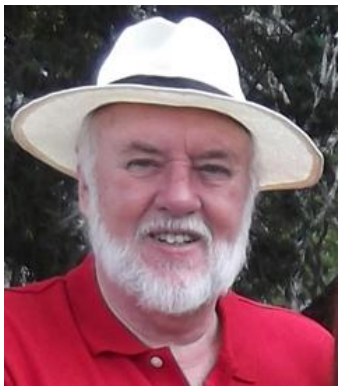

Dr. Stephen MUHL

Instituto de Investigaciones en Materiales, Departamento de Materiales de Baja Dimensionalidad, Universidad Nacional Autonoma de Mexico, Mexico, CDMX 04510, Mexico.
Tel. (+525) 556224736
E-mail: muhl@unam.mx
Personal website: https://plasnamatunam.wordpress.com/

Stephen Muhl was born in Lincolnshire, England a few miles from Boston (the original one) in 1953. He studied his first degree, Master of Arts and PhD in the University of Lancaster. Although about half the work was carried out in the Atomic Energy Research Establishment of Harwell. Following this he worked in the Facultad de Estudios Superiores, Cuautitlan, Mexico of the Universidad Nacional Autónoma de México (UNAM). Here he gave various courses on experimental physics and directed the studies of a couple of very talented undergraduate students, one of which concluded in the successful application of Mexican and British patents, his principal aim was learning about and enjoying the life of Mexico. Early in the 1980´s he transferred to the Instituto de Investigaciones en Materiales (IIM) of the UNAM in Mexico City and started to do research on the preparation and characterization of hydrogenated amorphous silicon based thin films using PECVD: this work also led to the a Mexican patent, as well as various publications and the formation of about 4 postgraduate students. In 1987, just after the 8.2 Richter scale Mexico City earthquake seriously damaged his apartment, he went to work with Dr. Arun Madan at Glasstech Solar, Denver, USA. Here he learned much more about a-Si:H and particularly how to make highly efficient solar modules of up to 120 x 40 cm. After three years Dr. Muhl decided to return to his position in the IIM-UNAM where his has continued to work until today. In 2003 Dr. Sandra Rodil and Stephen started the PlasNaMat (Plasmas and Nano-Materials) group, and in 2014 Dr. Muhl promoted the formation of the Department of Materiales de Baja Dimensionalidad en el IIM. The earlier studies on a-Si:H where quickly extend to include cubic boron nitride and amorphous carbon and diamond films, and somewhat later carbon nitride. From 2000 to today Dr. Muhl's research interests have focussed on studies of transition metal nitride and oxide hard coatings by magnetron sputtering, the use of plasma assisted processes to produce a-C coated metal and oxide nanoparticles, the growth of MWCNTs and the development of novel plasma sources. Dr. Muhl has published more than 90 articles with about 1000 citations, one book on silicon based solar cells, a couple of book chapters on carbon based materials, he has 7 patents (more are in process), has organized about 10 international conferences and symposia, and has had the great privileged to work with and guide the studies of more than 30 excellent students.

Five selected publications:

[1] S. Muhl, A. Pérez, *The use of hollow cathodes in deposition processes: A Critical Review*, Thin Solid Films, 579, 174 (2015).
[2] A. Perez, A. T. Luna, S. Muhl, *Characteristics of a toroidal planar hollow cathode and its use for the preparation of Bi nanoparticles*, J. Phys. D: Appl. Phys. 46, 505303 (2013).
[3] S. Muhl & J. M. Mendez, *A review of the preparation of carbon nitride films*, Diamond and Related Materials, 8, 1809 (1999).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Jin An Wang

Laboratory of Catalysis and Materials
Superior School of Chemical Enginering and Extractive Industries,
National Polytechnic Institute,
07738 Mexico City, Mexico
Tel. (0052) 55 57296000 Ext. 54276
Fax. (0052) 55 55862728
E-mail: jwang@ipn.mx
Personal website: www.sepi.esiqie.ipn.mx

Dr. Jin An Wang is a full professor in Chemical Engineering and adjunct professor in Petrochemical Engineering at the National Polytechnic Institute of Mexico. Dr. Wang obtained his Ph.D degree in Chemical Engineering from East China University of Science and Technology in 1995. He was a visiting professor of the Universidad Autónoma Nacional de México in 1996-1998 and the Worcester Polytechnic Institute in USA in 2014-2105. He is a Mexican National Researcher honored by the Consejo Nacional de Ciencias y Technología de México in 1998 and was selected as a member of Mexican Academy of Sciences in 2007. Dr. Wang is coauthor of more than 150 peer-reviewed scientific publications, 6 edited books and special volumes, and issued 6 patents. He has 130 contributions in national or international conferences including 25 invited lectures. He served as cochair of the Mexico-China Scientific Cooperation Conference and the first to seventh International Symposium on New Catalytic Materials. Dr. Wang's research interest focuses on the synthesis of new catalytic materials, catalysis for petroleum refining, catalysis for clean fuel production, and environmental catalysis.

Selected publications

[1] *Advanced Catalytic Materials*, Eds. by: L.E. Noreña, J.A. Wang. INTECH Publications Ltd. (2016).
[2] U. Arellano, J.A. Wang, G.Z. Cao, L.F. Chen, M. Asomoza, A. Estrella, S. Cipagauta, S. Solís. *Oxidation/elimination of heterocyclic sulfur compounds in a biphasic system with mesostructured FeOx/Ti-MCM-41 catalysts, J. Mol. Catal. A: Chem.* **421,** 66 (2016).
[3] M. T. Timko, J.A. Wang, J. Burgess, P. Kracke, L. Gonzalez, C. Jaye, D.A. Fischer. *Roles of surface chemistry and structural defects of activated carbons in the oxidative desulfurization of benzothiophenes*. *Fuel* **163**, 223 (2016).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Eduardo Sánchez-Cervantes

Laboratorio de Materiales para el Almacenamiento y Conversión de Energía, Facultad de Ciencias Químicas, Universidad Autonoma de Nuevo León, San Nicolás de los Garza, Nuevo León, Mexico.
Tel. (52) 818-320-4010
Fax. (52) 818-376-5375
E-mail: eduardo.sanchezcv@uanl.edu.mx
Personal website: www.example.com

Dr. Eduardo M. Sánchez received his BS in chemistry at Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM, México) in 1987 and his PhD in chemistry from Arizona State University (ASU, Unites States) under the guidance of Professor Charles A. Angell in 1994. Later he joined ITESM as an Assistant Professor. Currently is a Full-Time Professor at Universidad Autónoma de Nuevo León (UANL, México) and his research is focused on materials for alternative energy applications. Currently is head of the Research Group and Laboratory of Materials for Energy Storage and Converesion at his institution. Profr. Sanchez if affiliated to the Mexican Academy of Sciences, National Councial of Research, Mexican Materials Research Society and to the American Chemical Society. Also, Dr. Sanchez had receive multiple research awards at his University in the Exact Science and Engineering areas as well as several Patent Innovation prizes at this Institution.

Three to Five selected publications:

[1] N Pineda-Aguilar, VJ Gallegos-Sánchez LC Torres González, EM Sánchez-Cervantes , LL Garza-Tovar "Aluminum doped $Na_3V_2(PO_4)_2F_3$ via sol–gel Pechini method as a cathode material for lithium ion batteries" *J Solgel Sci Technol*, 83, 405-412 (2017).

[2] VJ Gallegos-Sánchez, LC Torres-González, EM Sánchez, L Garza-Tovar "Mesoporous $LiFeBO_3$/C Pechini synthesis for positive electrode in Li-ion batteries" *Dig J Nanomater Biostruc*, 11, 1063-1071 (2016).

[3] RA Hernandez-Carrillo, NA García-Gómez, DI García-Gutierrez, LL Garza-Tovar, EM Sánchez "Synthesis and characterization of electrospun iron-doped lithium titanate/carbón nanofiber mats" *Journal of Materials Science: Materials in Electronics* (2015) 26, 4241-4249 (2015).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Zhixiang WEI

National Center for Nanoscience and Technology, Chinese Academy of Sciences, Beijing, China
Tel. (86)-10-82545565
Fax. (86)-10-62656765
E-mail: weizx@nanoctr.cn
Personal website: http://www.nanoctr.cn/zhixiangwei

Prof. Zhixiang Wei received a BSc in 1997 and MSc in 2000 from Xi'an Jiaotong University. He received his PhD in 2003 from the Institute of Chemistry, Chinese Academy of Science (CAS). He then undertook postdoctoral research at the Max-Planck-Institute of Colloid and Interfaces (Germany) and University of Toronto. In 2006 he joined the National Center for Nanoscience and Technology of China as a professor.

Prof. Wei's research is focused on organic functional nanomaterials and flexible devices. He is using bottom-up approach to self-assemble organic functional nanostructures and supramolecular structures by adjusting non-covalent interactions. Further property investigations are also being carried out in his lab, which may lead potential applications in flexible photovoltaic and energy storage devices.

Prof. Wei has published more than 100 papers in peer review scientific journals, which have been cited more than 6000 times, and H-index is 40. Dr. Wei has been awarded various honors, including Chinese Academy of Science President Award in 2003, Hundred Talents Program of Chinese Academy of Sciences in 2006, Youth Chemist of Chinese Chemical Society in 2009, Outstanding Young Scientist Award of NSFC in 2011, First Prize of Beijing Science and Technology Award in 2011 and Second Prize of National Natural Science Award in 2014, Youth scientist award of Chinese Academy of Sciences in 2015, Chinese Youth Science and Technology Award in 2016..

Three to Five selected publications (11pt Times):

[1] D. Deng, Y. J. Zhang, J. Q. Zhang, Z. Y. Wang, L. Y. Zhu, J. Fang, B. Z. Xia, Z. Wang, K. Lu, W. Ma, Z. X. Wei, Fluorination-enabled optimal morphology leads to over 11% efficiency for inverted small-molecule organic solar cells. Nat. Cummun, 2016, 7, 13740

[2] L. Yuan, K. Lu, B.Z. Xia, J. Q. Zhang, Z. Wang, Z. Y. Wang, D. Deng, J. Fang, L.Y. Zhu, Z. X. Wei, Acceptor End-Capped Oligomeric Conjugated Molecules with Broadened Absorption and Enhanced Extinction Coefficients for High-Efficiency Organic Solar Cells. Adv. Mater. 2016, 28, 5980–5985.

[3] Y.J. Zhang, D. Deng, K. Lu, J.Q. Zhang, B.Z. Xia, Y.F. Zhao, J. Fang, Z.X. Wei, Oligomeric Donor Material for High-Efficiency Organic Solar Cells: Breaking Down a Polymer, Adv. Mater. 2015, 27, 1071.

[4] J. Q. Zhang, Y. J. Zhang, J. Fang, K. Lu, Z. Y. Wang, W. Ma, and Z. X. Wei, Conjugated Polymer−Small Molecule Alloy Leads to High Efficient Ternary Organic Solar Cells. J. Am. Chem. Soc., 2015, DOI: 10.1021/jacs.5b03449.

[5] Y. J. Zhang, D. Deng, K. Lu, J.Q. Zhang, B.Z. Xia, Y. F. Zhao, J. Fang, Z. X. Wei, Synergistic Effect of Polymer and Small Molecules for High-Performance Ternary Organic Solar Cells, Adv. Mater. 2015, 27, 1071.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Eduardo de Jesús Coutiño González

Centro de Investigación y Desarrollo Tecnológico en Electroquímica, SC, Parque Tecnológico Querétaro - Sanfandila, C.P. 76703, Querétaro, México.
Tel. (52) 442 2116000
E-mail: ecoutino@cideteq.mx
Personal website: www.cideteq.mx/dr-eduardo-jesus-coutino-gonzalez/

Eduardo Coutino-Gonzalez obtained his PhD in Chemistry at the KU Leuven (Belgium) under the supervision of Prof. Johan Hofkens and Prof. Bert Sels, working in the development of novel nanostructured materials for applications in optoelectronics, light harvesting and photocatalysis. After a postdoctoral period in the group of Prof. Hofkens he joined CIDETEQ (Mexico) as researcher of Cátedras-CONACYT where he is mainly working on the development and characterization of functional materials for clean energy production, (photo)catalysis and environmental remediation.

His main research interests are related to the synthesis of functional microporous materials through self-assembling processes; their characterization via several techniques such as fluorescence spectroscopy/microscopy, electron microscopy, X-ray diffraction, synchrotron-based techniques, among others; and their applications. Dr. Coutino-González has collaborated in several international research projects, including an European FP7 project (as scientific manager), and he has supervised several bachelor and master students. He is co-author of more than 20 publications in peer reviewed journals including Nature Materials, ACS Nano, JACS, Advanced Materials, Advanced Functional Materials, JPCC, JMCC, ChemComm, among others; resulting in a h-*index* of 8 (excluding self-citations).

Three to Five selected publications (11pt Times):

[1] Koen Kennes, Eduardo Coutiño-Gonzalez, Cristina Martin, Wouter Baekelant, Maarten Roeffaers, Mark Van der Auweraer, *Silver zeolite composites-based LEDs, a novel solid state lighting approach*, *Advanced Functional Materials.* **27**, 1606411 (2017).

[2] Thomas Altantzis, Eduardo Coutiño-Gonzalez, Wouter Baekelant, Gerardo T. Martinez, Artem A. Abakumov, Gustaaf van Tendeloo, Maarten Roeffaers, Sara Bals, Johan Hofkens, *Direct observation of luminescent silver clusters confined in faujasite zeolites*, *ACS Nano* **10**, 7604 (2016).

[3] Oliver Fenwick, Eduardo Coutiño-Gonzalez, Didier Grandjean, Wouter Baekelant, Fanny Richard, Sara Bonacchi, Dirk De Vos, Peter Lievens, Maarten Roeffaers, Johan Hofkens, Paolo Samorì, *Tuning the energetics and tailoring the optical properties of silver clusters confined in zeolites*, *Nature Materials.* **15**, 1017 (2016).

[4] Eduardo Coutiño-Gonzalez, Wouter Baekelant, Didier Grandjean, Maarten B.J. Roeffaers, Mark Van der Auweraer, Tom Vosch, Nicolas Bovet, Eduard Fron, Mohammad S. Aghakhani, Peter Lievens, Bert Sels, Johan Hofkens, *Thermally activated LTA(Li)-Ag zeolites with water-responsive photoluminescence properties*, *Journal of Materials Chemistry C.* **3**, 11857 (2015).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor Xiaoming Sun
(please do not use abreviations)

State Key Laboratory of Chemical Resource Engineering, Beijing
Univeristy of Chemical Technology,
Beijing, P.R. China
Tel. (8610) 64438991
Fax. (8610) 64438991
E-mail: sunxm@mail.buct.edu.cn
Personal website: www.sunxmgroup.com

Prof. Xiaoming Sun was born in 1976, acchieved his B.S. and Ph.D at 2000 and 2005 respectively in Tsinghua University. After finishing Postdoc work at Stanford from 2005 to 2008, he became a member of State Key Lab of Chemical Resource Engineering at March, 2008. He gained "Outstanding Young Investigator" foundation from Chinese Nature Scientific Foundation in 2011.

His research interest mainly focus on separation of nanocolloids, construction of nanoarrays for electrochemical energy storage and electrocatalysis. He hase published more than 90 peer reviewed journals including ***J. Am. Chem. Soc.***, ***Angew. Chem. Int. Ed.***, ***Adv. Mater.*** Etc, as first or corresonding authors. They have been cited more than 6000 times.

Selected publications:

[1] Zhiyi Lu, Xiaoming Sun, et al, *Nano Energy*, **10**, 229-234 (2014).
[2] Zhiyi Lu, Xiaoming Sun, Lei Jiang, et al, *Adv. Mater.*, **26**, 2683-2687(2014).
[3] Yingjie Li, Xiaoming Sun, et al, *Adv. Funct. Mater.*, *25*, 1737-1744 (2015).
[4] Zhiyi Lu, Xiaoming Sun, et al, *Adv. Mater.*, **27**, 2361 (2015).
[4] Zhiyi Lu, Xiaoming Sun, Lei Jiang, et al, *Adv. Mater.*, **28**, 7155-7161 (2016).

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2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Ph. D., Juan Carlos MEDINA

Plasmas and NanoMaterials Research
Group at the Material's Research
Institute-UNAM, IIM-UNAM, Mexico City, Mexico.
Tel. +52(55) 27458467
E-mail: 21.juancarlos@gmail.com
Personal website: http://plasnamatunam.wordpress.com/

I have knowledge and experience in materials science, chemistry, and chemical engineering in general and surface engineering and photoinduced processes in particular. During my Ph.D research, I have been involved in some international research projects (BISNANO and PHOCSCLEEN) working in synthesis and characterization of thin films for photocatalytic applications. As a part of the activities of these projects I did a research stay in Politectico di Torino (Italy, four months) where I had the opportunity to deal with some photoelectrochemical techniques to study the photocatalytic activity of some oxide semiconductor materials such as $Bi2O_3$ and TiO_2. Moreover, I have been working on the design and synthesis of metal oxide composite films (ZnO/Bi_2O_3, TiO_2/Bi_2O_3) for degradation of organic pollutants present in water using reactive magnetron sputtering and spray pyrolysis deposition techniques. I also have experience in: designing and assembly of vacuum systems for coatings deposition, thin films and nanostructured materials; designing and assembly of systems to study photoinduced process. Surface characterization: X-Ray diffraction, XPS, SEM, and spectroscopic ellipsometry measurements and analysis.

During my research career, I have published 9 peer-reviewed papers and I have two in the pipe-line. My areas of interest are: synthesis of thin films, photoelectrochemical and photocatalytic tests, water remediation, hydrogen production and surface characterization. I am seeking new and challenging opportunities for using and increasing my knowledge and experience for the benefit of the society.

[1] Osmary Depablos-Rivera, **Juan C. Medina**, Monserrat Bizarro, Ana Martínez, Andreas Zeinert, Sandra E. Rodil. Synthesis and properties of Bi5Nb3O15 thin films prepared by dual co-sputtering ISSN:0925-8388, Journal of Alloys and Compounds (2016) 1-10.

[2] **Juan C. Medina**, Monserrat Bizarro, Phaedra Silva-Bermudez, Mauro Giorgelli, Alberto Tagliaferro, Sandra E. Rodil. Photocatalytic discoloration of methyl orange dye by δ-Bi2O3 thin films ISSN:0040-6090, Thin Solid Films, Vol. 612, Pag.72-81..

[3] Agileo Hernández-Gordillo, **Juan C. Medina**, Monserrat Bizarro, Rodolfo Zanella, B. M. Monroy, Sandra E. Rodil. Photocatalytic activity of enlarged micro rods of alfa-Bi_2O_3 produced using ethylenediamine-solvent ISSN:0272-8842, Ceramics International, Vol.42, Pag.11866-11875.

[4] **J. C. Medina**, M. Bizarro, C. L. Gomez, O. Depablos-Rivera, R. Mirabal-Rojas, B. M. Monroy, A. Fonseca-Garcia, J. Perez- Alvarez, S. E. Rodil. Sputtered bismuth oxide thin films as a potential photocatalytic material ISSN:0920-5861, Catalysis Today, Vol. 266, Pag.144-152.

Qi Yu

School of Materials Science and Engineering, Shaanxi University of Technology, Hanzhong 723001, P. R. China.

Tel. (+86)18700644700
E-mail: kukukoko2004@163.com

Education and Experience:

Associate professor, school of materials science and engineering, Shaanxi University of Technology, 12/2016- .

Lecturer, school of materials science and engineering, Shaanxi University of Technology, 04/2014-12/2016.

Doctor of science, State key laboratory of superhard materials, Jilin University; Tutor: Prof. Hongdong Li; Research area: Nanomaterials, Nanoscience and nanotechnology, 09/2010-06/2013.

Master of science, State key laboratory of superhard materials, Jilin University; Tutor: Prof. Hongdong Li; Research area: Nanomaterials, Nanoscience and nanotechnology, 09/2008-06/2010.

Bachelor of science, School of physics, Jilin University, 09/2004-06/2008.

Research Projects:

The fabrication of ZnO/PET-ITO flexible device and the mechanism of photoelectric property, 01/2015-12/2018.

Hydrothermal synthesis, characterization and properties of ZnO grown on diamond films, 01/2015-12/2016.

Research articales:

[1] The highly efficient photocatalysts of B-doped ZnO microspheres synthesized on PET-ITO flexible substrate,*Ceramics International.* **43**, 2864 (2017).
[2] Fabrication and characterization of B-doped ZnO nanospheres synthesized on PET/ITO flexible substractes, *RSC advance,***6(85)**, 81965 (2016).
[3] Fabrication and characterization of Au-doped ZnO nanocandles synthesized on diamond film, *Materials Letters.***152**, 142-144 (2015).
[4] Hydrothermal synthesis, characterization and properties of boron-doped ZnO sheets grown on p-diamond film, *Materials Letters.***128**,284-286 (2014).
[5] Efficient energy transfer in Eu-doped ZnO on diamond film, *RSC advance,***4**, 53946 (2014).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Miss Ingrid Rodríguez

Applied physics department, The Center for Research and Advanced Studies of the National Polytechnic Institute, Oskam's research group,
Mérida, Yucatán 97310, México
Tel. (52) 999 942 9400 ext: 2242
E-mail: ingrid.rodriguez@cinvestav.mx

I graduated in 2012 in industrial chemistry (bachelor degree) at "Universidad Autónoma de Yucatán" (University of Yucatan). I started the master degree in "Center for Research and Advanced Studies of the National Polytechnic Institute" in 2012 in Physical chemistry field and I presented my master thesis in 2014 with the title of "Synthesis and characterization of $BiFeO_3$ for solar water splitting". Now I am working on synthesis and characterization of metal oxide semiconductor specially $CuBiO_2$, $CuBiO_4$, WO_3, hematite and $BiVO_4$. I am third-year PhD student at "Center for Research and Advanced Studies of the National Polytechnic Institute" in Gerko Oskam's research group. I am interested in synthesis and characterization of new materials for water splitting applications. I have experience in electrochemical characterization techniques such as Electrochemical Impedance Spectroscopy (EIS), Intesity-Modulated Photocurrent Spectroscopy (IMPS), Intensity-Modulated Photovoltage Spectroscopy (IMVS) and current-voltage curves. Also I have experience in material synthesis by different methods asuch as Microwave-assited, hydrothermal, sol-gel and electrodeposition and film deposition techniques such as Ink-jet printing, screen pinting, spincoating, Dr. blading, drop casting and dip coating.

Participation in scientific conferences:

[1] I. Rodriguez Gutierrez, R. García Rodríguez, G. Oskam . ***Photoelectrochemical Characterization of Metal Oxides for Solar Water Splitting*** 21st Topical Meeting of the International Society of Electrochemistry; Hungary 2017.
[2] I. Rodriguez Gutierrez, M. Rodriguez-Perez, G. Rodriguez-Gattorno, G. Oskam ***. p-$CuBi_2O_4$ inkjet-printed thin films for photoelectrochemical water splitting***. XXV international material research congress; Mexico 2016.
[3] I. Rodriguez Gutierrez, M. Flores Pinto, M. Rodriguez-Perez, G. Rodriguez-Gattorno, G. Oskam. ***Photoelectrochemical characterization of Spin-Coated $CuBi_2O_4$. Thin Films for Water Splitting***. 228th ECS. Phoenix AZ, United State. October 2015.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Prof. Jian Zhang

Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, China 350002
Tel. (+86) 591 63179450
Fax. (+86) 591 63179450
E-mail: zhj@fjirsm.ac.cn
Personal website: http://www.fjirsm.cas.cn/research/R1/zhangjian/

Jian Zhang was born in Hunan, China. He graduated from Xiamen University in 2001 and obtained his Ph.D. in 2006 from the Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences (FJIRSM-CAS). After three years of postdoctoral work with Prof. Xianhui Bu at California State University, Long Beach, he came back to FJIRSM-CAS and served as a full research professor in September 2009. He has authored and coauthored more than 200 peer-reviewed papers. In 2014, he won National Science Fund of Distinguished Young Scholars. His current research interest is in the synthesis and application of metal–organic complexes.

Five selected publications:

[1] Zhiqiang Jiang, Jinxiu Liu, Meiyan Gao, Xi Fan, Lei Zhang*, Jian Zhang*, "Assembling Polyoxo-Titanium Clusters and CdS Nanoparticles to Porous Matrix for Efficient and Tunable H2 Evolution Activities with Visible Light", *Adv. Mater.* **2017**, 29, 1603369 (1-5).

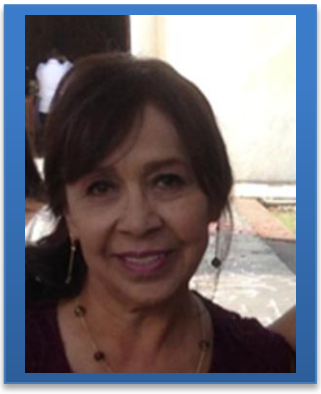
[2] Mei-Yan Gao, Fei Wang, Zhi-Gang Gu, De-Xiang Zhang, Lei Zhang*, Jian Zhang*, "Fullerene-Like Polyoxotitanium Cage with High Solution Stability", *J. Am. Chem. Soc.* **2016**, *138*, 2556-2559.

[3] Wei-Hui Fang, Lei Zhang* and Jian Zhang*, "A 3.6 nm Ti_{52}-Oxo Nanocluster with Precise Atomic Structure", *J. Am. Chem. Soc.* **2016**, 138, 7480-7483.

[4] Jin-Xiu Liu, Mei-Yan Gao, Wei-Hui Fang, Lei Zhang* and Jian Zhang*, "Bandgap Engineering of Titanium–Oxo Clusters: Surface Labile Sites Method for Ligand Substitution and Metal Incorporation", *Angew. Chem. Int. Ed.* **2016,** 55, 5160-5165.

[5] Zhi-Gang Gu†, Caihong Zhan†, Jian Zhang*, Xianhui Bu*, "Chiral Chemistry of Metal-camphorate Frameworks", *Chem. Soc. Rev.* **2016**, 45, 3122 – 3144.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology



Dr. Refugio RODRÍGUEZ-VÁZQUEZ
Biotechnology and Bioengineering Department; 2. Nanosciences and Nanotechnology Program/CINVESTAV/Xenobiotics, Research Center and Advanced Studies of the National Polytechnic Institute, Mexico City/Mexico

Tel. (52) 5557473316
Fax. (52) 5557477002
E-mail: rrodrig@cinvestav.mx

Researcher at Dept. de Biotechnology and Bioingeneering, Research Center and Advances Studies of the National Polytechnic Institute (CINVESTAV-IPN). PhD, Forest and Wood Sciences, Colorado State University, Fort Collins, Colorado, E.U.A. 1993. Regular Member of the Mexican Academy of Sciences 2000-actual. Member of the National Reserchers System, Level III 2016-2019. Award "Premio Hilario Ariza" in Reserach given by the Counsil of Egresados de la ESIQIE-IPN, 2000. Participation in the Binacional México-Estados Unidos Hazardous Waste and the U.S. -México Border Region Toward a Binational, University -based Institution, 2000. Workshop on Biotechnology. Center of Scientific Research Yucatán Merida Mexico, 2000, Scientific and Technologiacal Cooperation, Mexico-Germany. Invited Expert in the Worshop Selection of Technologies for the Restauration of "Cerro de Moravia", Medellín, Colombia, 2006- 2007. Workshop in Bioremediation, Mumbai, India, 2013. Organizer of National and International Meetings and Symposia. 84 National and International Conferences. 27 Chapters in Books. One Published Book. 26 Ph D and 48 MSc graduated students. 103 original published papers in Indexed Journals.

Publications:

[1] Denisse F., González-Ramírez, Pedro Ávila-Pérez, Luis G.Torres-Bustillos, Ricardo Aguilar-López, María C. Montes-Horcasitas, Fernando J. Esparza-García F., Refugio Rodríguez-Vázquez. *Removal of Phenanthrene in Aqueous Solution by TiO_2-C-Ag Film Supported in Fiberglass on the Presence of Photon Competitors*. *J. of Environmental Helath and Science Part* B. DO:10.1080/10934529.2017.1303311. (2017).

[2] Claudia M., Rivera-Hoyos, Edwin D. Morales-Alvarez, Raúl A. Potou-Piñales, Aura M. Pedroza-Rodríguez, Refugio Rodríguez-Vázquez, Juan.M. Delgado-Boada. *Fungal lacases, Fungal Biology Review* **27,** 67 (2013).

[3] Natalia Tapia-Orozco, Refugio Rodríguez-Vázquez. *Photoactive TiO_2 films formation by drain coating for endosulfan degradation. International Journal of Photoenergy.* **1-10**. 560840 DOI: 10.1155/2013/560840 Published. (2013).

[4] Aura M. Pedroza, Rodolfo Mosqueda, Nicolás Alonso-Vante, Refugio Rodríguez-Vázquez. *Sequential Treatment Via* Trametes Versicolor *and UV/TiO_2/RuxSey to Reduce Contaminants In Waste Water Resulting from the Bleaching Process During Paper Production. Chemosphere*. **67(4)** 793. DOI: 10.1016/j.chemosphere.2006.10.015. (2007).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Yichuan Li

State Key Laboratory of Heavy Oil Processing
China University of Petroleum (East China)
No. 66 Changjiang West Road,
Qingdao, Shandong,
China, 266580
Tel. (+86) 15908936495
E-mail: liyichuan@upc.edu.cn

School of Chemical Engineering, East China University of Science and Technology
2003.9 ~ 2007. 6
Degree: B.E. of Chemical Engineering and Technology
School of Chemical Engineering, East China University of Science and Technology
2007.9 ~ 2013.11
Degree: Ph.D. of Chemical Technology
College of Chemical Engineering, China University of Petroleum (East China)
2014.4 ~ now
Lecturer
Chemical & Biological Engineering, University of British Columbia
2017.6 ~ 2018.6
Visiting Scholar

Interests:

- Synthesis, characterization, and application of TS-1 molecular sieve
- Design and synthesis of novel catalytic reactors for olefin oxidation

Publications:

[1] Yichuan Li, Benxian Shen, Jigang Zhao. Effect of propylene glycol monomethyl ether and rust impurities on TS-1 deactivation in propylene epoxidation[J]. Catalysis Today, 2013, 212: 169-174.

[2] Yichuan Li, Benxian Shen, Weiguo Xiao, Jigang Zhao. Steam Consumption on Solvent Recovery Process of 1500t/a Propylene Oxide Pilot Plant-Simulation and Optimization[J]. Asian Journal of chemistry, 2013, 25(16): 8905-8908.

[3] Yichuan Li, Benxian Shen, Lei Wang, Weiguo Xiao. Research of adsorbing microimpurity in propylene oxide product solution[C]. 2013 2nd International Conference on frontier of energy and environment engineering, ICFEEE 2013, 353-357, 2013/11/28-2013/11/29.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor Velumani Subramaniam

Profesor Investigador en Ingeniería Eléctrica(SEES),
Centro de Investigación y de Estudios Avanzados del
I.P.N.(CINVESTAV), Av. Instituto Politécnico Nacional # 2508,
Col. San Pedro Zacatenco
07360, México D.F.
Tel :+52 (55) 5747 3978
E-mail: velu@cinvestav.mx
Personal website: http://mreb.cinvestav.mx/

Prof. S. Velumani received Ph.D. in Thin Film Physics from Bharathiar University in the year 1998. Employed as Lecturer/Assistant Professor at various places in India and Mexico and presently working as full time Professor in the Electrical Engineering Department (SEES) at CINVESTAV-IPN, Mexico. His research interest includes synthesis and characterization of CIGS, CZTS, ZnO, Carbon nanotubes, Graphene for solar cell applications. He is also a Connoisseur in synthesis of $BiVO_4$, TiO_2, SPIONS and Core-shell (Au-Fe_3O_4) nanoparticles for photocatalytic and biomedical applications. Recently won mega project of about 2 Millon USD for the construction of water treatment plant using solar energy and nanomaterials. In 2009 he won a very prestigious project to set up National Laboratory for microscope now named as "Laboratorio Avanzado de Nanoscopia Electronica" with an investment of about 4 Million USD. During the period 2009 to 2015 won various projects from CONACyT, European Union, Mexican industries related to bismuth Vanadate, Au:Fe_3O_4 core shell for medical application etc. Recently participating as executive committee member in the Coordination for Innovation, in the prestigious Mexican Government initiative on "Centro Mexicano de Innovación en Energía Solar (CEMIE-Sol)." Served as coordinator for international relations from 2008 to 2013. So far published more than 150 research articles in leading peer reviewed international journals with about 1300 citations. Served as guest editor for about 10 special volumes of various journals published from Elsevier, Springer and TransTech etc. Presently serving as editorial board member in the journals Materials Science in Semiconductor processing, and Elsevier journal and "Nanotrends - A journal of Nanotechnology and its Applications". Guided about 12 undergraduate thesis, 14 postgraduate (Masters) thesis, Eleven (11) PhD student have completed their thesis, and seven (7) students are pursuing their PhD under his guidance on various topics. Served as visiting professor in Universite du Maine, France; University of Twente, Enschede, The Netherland and Sungkyunkwan University South Korea on various occasions.

Three selected publications (http://mreb.cinvestav.mx/ All publications are available)

[1] Babu B.J, Velumani S et al, Deposition and Characterization of Graded Cu(In1-xGax)Se2 Thin Films by Spray Pyrolysis,– Materials Chemistry and Physics, 162(2015)59-68

[2] Victor Ishrayelu Merupo, S.Velumani, et al High Energy Ball-Milling Synthesis of Nanostructured Ag-Doped and $BiVO_4$-Based Photocatalysts, Chemistry Select; Catalysis ChemPubSoc, Europe. Volume 1, Issue 6, May 1 (2016) Pages 1278–1286

[3] M. Ravichandran, S. Velumani, et al, Plasmonic/Magnetic Multifunctional nanoplatform for Cancer Theranostics, Nature Scientific Reports, Oct 6:34874 (2016) DOI: 10.1038/srep34874 John Doe, *Yet Another Example*, *J. Phys.* **123**, 1234 (2000).

Professor, Zhang LIN

School of Environment and Energy, South China University of Technology, Guangzhou 510006, P. R. China
Tel. (020) 39380503
Fax: (020) 39380508
E-mail: zlin@scut.edu.cn
http://hnlghjxy.qiyiw.net/

Lin, Zhang currently is a professor of School of Environment and Energy, South China University of Technology, where she began teaching and research since 2015. She was a research professor of Environmental Science at Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences (CAS) from 2005-2014. Dr. Lin received her Ph.D in Physical Chemistry from Institute of Chemistry, CAS in 1999 and occupied postdoctoral positions in Department of Chemistry, University of Wisconsin-Madison and Environmental Science Division, Lawrence Berkeley National Lab from 1999-2004. Dr. Lin's current research interests include the crystal growth kinetics of nanoparticles and the relevant environmental applications, including the recycling and concentrating of heavy metal from industrial sludges or from nano-adsorbents after usage. She also studies microbial mineralization of heavy metal minerals, the structure, properties, and transformation of biogenic nanoparticles. Through applying nanocrystal growth kinetics and the surface/interfacial control theory, Dr. Lin has been contributing a number of innovative efforts to achieve the targets of''recyclable use'' and ''long-term stability'' of heavy metals via fast crystal growth as well as bio-mineralization. Her research was supported by multiple grants from the National Natural Science Foundation of China, the National Basic Research Program and the Strategic Priority Research Program A of CAS. She is the author and co-author of 140 peer-reviewed original research papers including over 10 papers published in J. Am. Chem. Soc.; Angew. Chem. Int. Ed.; PNAS; Nano Letter; Environ. Sci. Technol.. Dr. Lin won the National Natural Science Fund for Distinguished Young Scholars in 2011, the national candidate under the "Millions of Talents Project" in 2013, the Young and Middle-Aged Leaders of Science and Technology under the Ministry of Science and Technology in 2014, and the "Ten Thousand Talent Program" under the Ministry of Science and Technology in 2016. Currently, she serves as the principal professor for Innovation Team in Guangdong Province in 2017, and also as the director of Guangdong Engineering and

Three to Five selected publications:

[1] Z. Y.Zhuang, F. Huang, Z.Lin *, H. Z. Zhang * Aggregation-induced fast crystal growth of SnO_2 nanocrystals, *Journal of the American Chemical Society*, **134**, 16228−16234 (2012).

[2] W. Z. Liu, F. Huang, Y. J. Wang, T. Zou, J. S. Zheng, Z. Lin, * Recycling $Mg(OH)_2$ nanoadsorbent during treating the low concentration of Cr^{VI}, *Environmental Science & Technology*, , **45**, 1955-1961 (2011).

[3] W. Z. Liu, F. Huang, Y. Q. Liao, J. Zhang, G. Q. Ren,Z. Y. Zhuang, J. S. Zhen, Z. Lin *, C. Wang, Treatment of Cr-VI-containing $Mg(OH)_2$ nanowaste, *Angewandte Chemie-International Edition*, **47**, 5619-5622 (2008).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Erika Bustos

Biotechnology and Environmental Electrochemistry Group, Science Direction, Center of Research and Technological Development in Electrochemistry.
Technological Park, Sanfandila, Pedro Escobedo, Queretaro, Qro. Mexico.
Tel. (442) 2 11 60 59
Fax. (442) 2 11 60 01
E-mail: ebustos@cideteq.mx
Personal website: www.cideteq.com

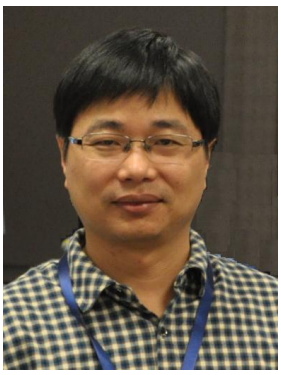
National Researcher Level II of National System of Researchers (SNI) of the National Council of Science and Technology (CONACyT), with postdoctoral position in the Center for Research and Advanced Studies of the National Polytechnic Institute (CINVESTAV - IPN) in the area of Chemistry. Doctorate in Electrochemistry at the Center for Research and Technological Development in Electrochemistry S. C. (CIDETEQ) with specialty in Modified Electrodes, wich obtained three national awards for the best PhD thesis. Master in Chemical Sciences from the University of Guanajuato. Environmental Engineer of the Interdisciplinary Professional Unit of Biotechnology of the National Politecnique Institute (UPIBI - IPN). Work experience at the Mexican Corporation for Research in Materials, S.A. (COMIMSA), the Mexican Petroleum (PEMEX), the National Water Commission (CNA) and the Subdirection of Urban and Special Wastes of the National Institute of Ecology (INE). She is currently Deputy Director of Continuing Education and Postgraduate, as well as working in the Biotechnology and Environmental Electrochemistry Group of the Science Directorate at CIDETEQ, and is currently Research Professor of Engineering "C" developing two research lines with concurrent CONACyT funds and commercialized with companies and national and international academic institutions: (1) electrokinetic treatment of solid and liquid matrices contaminated with organic and inorganic compounds; (2) design, construction, characterization and application of modified surfaces for the transformation and detection of molecules of biological and environmental importance in different Matrices. Projects that have generated collaborations with other institutions at national and international level, book chapters, indexed articles, articles of popularization, extensive memoirs, prizes for research work directed at the level of summer stays, bachelor's, master's and doctorate, as well Such as patent registers and utility models.

Among the latest outstanding achievements is the 2015 Alejandrina Award in the Young Research Talent Category, the Women in Science Fellowship L'Oreal - United Nations Educational, Scientific and Cultural Organization (UNESCO) - Mexican Academy of Sciences (AMC) 2012, US Summer Internship Program for Young Researchers 2012 through the AMC and the Mexico-United States Foundation for Science (FUMEC) at the University of Lehigh in Pennsylvania, U.S.

Three to Five selected publications (11pt Times):

[1] G. Acosta – Santoyo, C. Cameselle and E. Bustos. *Environ. Res.* **158**, 118 (2017)
[2] R. A. Herrada, A. Medel, F. Manríquez, I. Sirés and E. Bustos. *J. Hazard. Mater.* **319**, 102 (2016).
[3] J. A. García, D. Monzón-Hernández, O. Cuevas, B. Noriega-Luna and E. Bustos, *J. Chem. Technol. Biotech.* **91**, 2162 (2016).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology



Prof. Daohui Lin

Department of Environmental Science, Zhejiang University, Hangzhou 310058, China
Tel. (0086) 571 88982582
Fax. (0086) 571 88982590
E-mail: lindaohui@zju.edu.cn
Personal website: http://person.zju.edu.cn/en/0098366

Prof. Lin is the director of Environmental Process Institute, Zhejiang University, China. He obtained his Ph.D. in environmental science from Zhejiang University in 2005, M.S. in environmental science from Beijing Normal University in 1998, and B.S. in geography from Hangzhou University in 1995. He worked as a visiting scholar (2006-2008) at University of Massachusetts at Amherst. His research focuses on environmental behavior and ecological effect of engineered nanomaterials. He illustrated mechanisms underlying the nano-bio interfacial interactions and revealed that nanoparticles can accumulate on the bio-surfaces through specific and/or non-specific interactions, damage and enter cells, and thereby present toxicity; the widely distributed dissolved organic matter (DOM) in the environment would inhibit or enhance the nanotoxicity by altering the nano-bio interfacial interactions. He revealed that DOM can bind on the surface of hydrophobic carbon nanotubes (CNTs) mainly by π-π and hydrophobic interactions; the adsorbed DOM would increase hydrophilicity of the CNTs and thereby enhance aqueous stabilization of CNTs together with the increased electrosteric repulsions between CNTs, and enhance the transport of CNTs through porous media and the adsorption of heavy metal ions by CNTs. He has published 90 research papers, and seven of his papers are ranked as the highly-cited papers in recent 10 years in Web of Science. He is a recipient of the National Natural Science Fund of China for Distinguished Young Scholars and the chief PI of a National Key Research and Development Program of China, and currently serves as editorial board members of *Environmental Pollution* and *Science of the Total Environment*.

Selected publications:

[1] Fang, J.; Wang, M.H.; Shen, B.; Zhang, L.Q. **Lin, D.H.** Distinguishable co-transport mechanisms of phenanthrene and oxytetracycline with oxidized-multiwalled carbon nanotubes through saturated soil and sediment columns: Vehicle and competition effects. *Water Res.* 2017, 108, 271−279.

[2] Ma, S.; Zhou, K.J.; Yang, K.; **Lin, D.H.** Hetero-agglomeration of oxide nanoparticles with algal cells: Effects of particle type, ionic strength and pH. *Environ. Sci. Technol.*, 2015, 49, 932−939.

[3] Zhang, L.Q.; Lei, C.; Chen, J.J.; Yang, K.; Zhu, L.Z.; **Lin, D.H.** Effect of natural and synthetic surface coatings on the toxicity of multiwalled carbon nanotubes toward green algae. *Carbon*, 2015, 83, 198−207.

[4] Tian, X.L.; Zhou, S.; He, X.; Zhang, Z.Y.; Yu, M.J.; **Lin, D.H.** Metal impurities dominate the sorption of a commercially available carbon nanotube for Pb(II) from water. *Environ. Sci. Technol.,* 2010, 44, 8144–8149

[5] **Lin, D.H.**; Xing, B.S. Tannic acid adsorption and its role for stabilizing carbon nanotube suspensions. *Environ. Sci. Technol.*, 2008, 42, 5917−5923.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Hanying LI

Department of Polymer Science and Engineering, Zhejiang University, Hangzhou, 310027, P. R. China.
Tel. (86) 571 87952708
Fax. (86) 571 87952708
E-mail: hanying_li@zju.edu.cn
Personal website: http://person.zju.edu.cn/en/hanying_li

Hanying Li is the Qiushi Distinguished Professor in the Department of Polymer Science and Engineering at Zhejiang University, China. In Dec. 2009, he completed his Ph.D. degree at Cornell University in the field of materials science and engineering (advisor: Prof. Lara A. Estroff). Subsequently, he did his postdoc work on organic electronics at Stanford University with Prof. Zhenan Bao. He got the MRS graduate student silver award for his Ph. D. research on polymer/single-crystal composites. And after the postdoc work, he won the award of "National 1000 Young Talents Program" from the Chinese government and became a full professor in Zhejiang University. In 2013, he won the "PAT 2013 Life-Time Achievement Award (Junior)" in 12th Polymers for Advanced Technologies (PAT) conference at Berlin. In 2016, he won "The National Science Fund for Distinguished Young Scholars" and became the Qiushi Distinguished Professor. His current research focuses on bio-inspired single-crystal growth and organic-single-crystal-based electronic and optoelectronic devices such as transistors and solar cells.

Three to Five selected publications (11pt Times):

[1] Wu JK, Li QF, Xue GB, Chen HZ, Li HY*, Preparation of Single-Crystalline Heterojunctions for Organic Electronics, *Adv. Mater.* **2017**, 1606101

[2] Xue GB, Wu JK, Fan CC, Liu S, Huang ZT, Liu YJ, Shan BW, Xin HL, Miao Q, Chen HZ, Li HY*, Boosting the electron mobility of solution-grown organic single crystals via reducing the amount of polar solvent residues, *Mater. Horiz.*, **2016**, *3*,119-123

[3] Wu JK, Fan CC, Xue GB, Ye T, Liu S, Liu RQ, Chen HZ, Xin HL, Xiong RG*, Li HY*, Interfacing Solution-Grown C_{60} and (3-pyrrolinium)($CdCl_3$) Single-Crystals for High-Mobility Transistor Based Memory Devices, *Adv. Mater.* **2015**, *27*, 4476-4480.

[4] Li HY*, Fan CC, Fu WF, Xin HL, Chen HZ*, Solution-grown organic single-crystalline donor-acceptor heterojunctions for photovoltaics, *Angew. Chem. Int. Ed.*, **2015**, *54*, 956-960.

[5] Liu YJ, Yuan WT, Shi Y, Chen XQ, Wang Y, Chen HZ, Li HY*, Functionalizing Single-Crystals: Nanoparticle Incorporation Inside Gel-Grown Calcite Crystals. *Angew. Chem. Int. Ed.* **2014**, *53*, 4127-4131.

Msc. Erick Medardo Tejada Carbajal

Erick M. Tejada Carbajal
Environmental Chemical Engineering Laboratory, ESIQIE, Instituto Politécnico Nacional, Zacatenco, México D.F.,
Tel. +521 5576589241
Email:zaratustra11083@yahoo.com.ar

I am Chemical Engeeniring with master degrees in finance and Chemical Engineering. Currently I am a Chemical Engineering PhD candidate in the Research Laboratory in Environmental Chemical Engineering from the Graduate studies and research section of the School of Chemical Engineering and Extractive Industries in the National Polytechnic Institute, Mexico City. In the academic field, I am interested in themes like foam fractionation, surfactants and interfaces, pollutants movilization, Green chemestry, bioenergy simulation, production of biofuels from algae processes, biopolimers, biocatalisys and environmental remedation of soils and other matrices. My Master degree thesis was developed in the study of a foam fractionation process for the SDS surfactant applied to a removal of heavy hydrocarbons in a porous media with the core objective to further applications in washings of contaminated soils with heavy oil fractions. My investigation for my PhD thesis is linked to the production of biodiesel from microalgae, using a biorefinery approach and simulation tools for the processes involved.

[1] Thomas B Bovinga , Mark L Brusseau. (2000). Solubilization and removal of residual trichloroethene from porous media: comparison of several solubilization agents. Journal of Contaminant Hydrology, 42, 51-67.

[2] Torres LG, Iturbe R and Orantes JL. (2003). Three surfactants CMC and diesel removal efficiencies from highly contaminated sandy soils. Environ Geosci. 10(1):28–36.

[3] Paul Stevenson and Xueliang Li. (2014). Modes of operation. Foam Fractionation Principles and Process Design(92-112). Estados Unidos: CRC Press.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Qiangbin WANG

CAS Key Laboratory of Nano-Bio Interface, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou, China.
Tel. (86) 512-62872620
Fax. (86) 512-62872620
E-mail: qbwang2008@sinano.ac.cn
Personal website: www.wang-lab.com

Dr. Wang is a Professor of Chemistry in Suzhou Institute of Nano-Tech and Nano-Bionics (SINANO), Chinese Academy of Sciences. He got his Ph.D from East China University of Science and Technology in 2002. He worked as a Postdoc Associate and later as an Assistant Research Professor at Arizona State University from 2004 to 2008. In July 2008, he joined SINANO as a Professor focusing on controlled synthesis of inorganic semiconductor nanocrystals and their bioapplications. In particular, for the first time, he developed a new system of Ag_2S quantum dots with fluorescence emission in the second near-infrared window (NIR-II, 900-1700 nm) and commercialized the NIR-II in vivo imaging system, which greatly improves the in vivo fluorescence imaging in terms of the tissue penetration depth, spatio resolution and temporal resolution. Dr. Wang has been awarded "National Outstanding Young Scientist" by NSFC and "Distinguished Lectureship Award" by Japanese Chemical Society. He is now the Assistant Director of SINANO and the Director of Key Laboratory of Nano-Bio Interface of Chinese Academy of Sciences.

Selected publications:

[1] Yaping Du, Bing Xu, Tao Fu, Miao Cai, Feng Li, Yan Zhang, and Qiangbin Wang*, *Near-Infrared Photoluminescent Ag_2S Quantum Dots from a Single Source Precursor*, *J. Am. Chem. Soc*. **132**, 1470 (2010).
[2] Shuling Shen, Yejun Zhang, Long Peng, Yaping Du, Feng Li, Bing Xu, Qiangbin Wang*, *Matchstick-Shaped Ag_2S–ZnS Heteronanostructures Preserving both UV/Blue and Near-Infrared Photoluminescence*, *Angew. Chem. Int. Ed*. **50**, 7115 (2011).
[3] Guosong Hong, Joshua T. Robinson, Yejun Zhang, Shuo Diao, Alexander L. Antaris, Qiangbin Wang*, Hongjie Dai*, *In Vivo Fluorescence Imaging with Ag2S Quantum Dots in the Second Near-Infrared Region*, *Angew. Chem. Int. Ed*. **51**, 9818 (2012).
[4] Chunyan Li, Feng Li*, Yejun Zhang, Wenjing Zhang, Xian-En Zhang, Qiangbin Wang*. *Real-Time Monitoring Surface Chemistry-Dependent In Vivo Behaviors of Protein Nanocages via Encapsulating an NIR-II Ag_2S Quantum Dot*, *ACS Nano*. **9**, 12255 (2015).
[5] Chunyan Li, Yejun Zhang, Guangcun Chen, Feng Hu, Kui Zhao, Qiangbin Wang*, *Engineered Multifunctional Nanomedicine for Simultaneous Stereotactic Chemotherapy and Inhibited Osteolysis in an Orthotopic Model of Bone Metastasis*, *Adv. Mater*. DOI: 10.1002/adma.201605754 (2017).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Ling-Dong Sun

College of Chesmitry, Peking University, Beijing, China
Tel. (86) 10-62754179
Fax. (86) 10-62754179
E-mail: sun@pku.edu.cn
Personal website: http://www.chem.pku.edu.cn/resim/

Ling-Dong Sun obtained her PhD from Changchun Institute of Physics, Chinese Academy of Sciences, in 1996. Following a postdoctoral fellowship at Peking University, she joined the faculty at the College of Molecular Science and Engineering, Peking University, in 1998. She was promoted to associate professor (1999) and professor (2010). She worked as a visiting professor at Keio University (2001) and Kyoto University (2007). Her current research focuses on the synthesis and applications of rare earth and semiconductor nanomaterials.
Ling-Dong Sun was awared a "Research Prize for Youth Scientists" (the Hok Ying Dong Education Foundation) in 2006, and "Young Scientist Award" (China Association for Science and Technology) in 2007, the 2nd Grade National Award of Natural Science in 2011. And she was supported by the Distinguished Youth Funds (Natural Science Foundation) in 2014 to carry out research on lanthanide luminescent nanoamterials.

Three to Five selected publications:

[1] Yang Li, Jinglong Tang, Dong-Xu Pan, Ling-Dong Sun,* Chunying Chen,* Ying Liu, Ye-Fu Wang, Shuo Shi, Chun-Hua Yan*, *ACS Nano*, **10**(2), 2766-2773 (2016).

[2] Hao Dong, Ling-Dong Sun,* Ye-Fu Wang, Jun Ke, Rui Si, Jia-Wen Xiao, Guang-Ming Lyu, Shuo Shi, Chun-Hua Yan,* *J. Am. Chem. Soc*., **137**(20), 6569 (2015)

[3] Ling Wang, Hao Dong, Yannian Li, Chenming Xue, Ling-Dong Sun,* Chun-Hua Yan,* Quan Li,* *J. Am. Chem. Soc*., **136**(12), 44803 (2014).

[4] Ye-Fu Wang, Gao-Yuan Liu, Ling-Dong Sun,* Jia-Wen Xiao, Jia-Cai Zhou, Chun-Hua Yan*, *ACS Nano*, **7**(8), 7200-7206 (2013)

[5] Hao Dong, Ling-Dong Sun*, Wei Feng, Yuyang Gu, Fuyou Li, Chun-Hua Yan*, *ASC Nano* **11** (3), 3289 (2017)

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor Arturo Morales-Acevedo

Centro de Investigación y de Estudios Avanzados (CINVESTAV)
del IPN
Elecrical Engineering Department-SEES
Avenida IPN No. 2508, 07360 México, D. F.
México
Tel. (55) 57473781
E-mail: amorales@solar.cinvestav.mx
http://solar.cinvestav.mx/ama.htm

Full Professor at Centro de Investigación y de Estudios Avanzados del IPN, in Mexico city, and fellow member of the Mexican System for Scientific Research (SNI) at the highest level (III). He is also a member of the Mexican Academy of Sciences. Dr. Morales-Acevedo has worked for more than 30 years in the physics and technology of solar cells. He is a senior member of the IEEE and Associate Editor for Solar Energy Journal (Elsevier) and Journal of Electronic Materials (Springer). He also edited the book entitled "SOLAR CELLS – RESEARCH AND APPLICATION PERSPECTIVES", published by **InTech**, in 2013. Recently he collaborated with colleagues at the Institut des Molécules et Matériaux du Mans of Université du Maine, in France, and the Institute of Physics of Jan Dlugosz University in Czestochowa, Poland, for developing new photo-catalytic materials. Some of his recent publications are:

[1] M. A. Ruiz-Preciado, A. Bulou, M. Makowska-Janusik, A. Gibaud, A. Morales-Acevedo and A. Kassiba, "Nickel titanate (NiTiO3) thin films: RF-sputtering synthesis and investigation of related features for photocatalysis", CrystEngComm (2016)

[2] R. Bernal-Correa, A. Morales-Acevedo, J. Montes-Monsalve and A. Pulzara-Mora, "Design of the TCO (ZnO:Al) thickness for glass/TCO/CdS/CIGS/Mo solar cells", J. Phys. D: Appl. Phys. 49 (2016) 125601.

[3] M. A. Ruiz-Preciado, A. Kassiba, A. Morales-Acevedo and M. Makowska-Janusik, "Vibrational and Electronic Peculiarities of $NiTiO_3$ nanostructures inferred from first principle calculations", Royal Society of Chemistry Advances 5, 17396-17404 (2015).

[4] A. Ruiz-Preciado, A. Kassiba, A. Gibaud, A. Morales-Acevedo, "Comparison of nickel titanate ($NiTiO_3$) powders synthesized by sol–gel and solid state reaction", Materials Science in Semiconductor Processing 37, 171-178 (2015).

[5] R. Bernal-Correa, A. Morales-Acevedo, A. Pulzara Mora, J. Montes Monsalve, M. López López, "Design of $Al_xGa_{1-x}As/GaAs/In_yGa_{1-y}As$ triple junction solar cells with anti-reflective coating", Materials Science in Semiconductor Processing 37, 57-61 (2015).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Juan Ma

Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
18 Shuangqing Road, Haidian, Beijing 100085, China
Tel. (86) 10-62849050
E-mail: juanm@rcees.ac.cn
Personal website: www.rcees.ac.cn

Scientific Degrees:
2011/09~2016/06: PhD, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, China
2007/09~2011/06: Bachelor, College of Environmental science and technology, South China technology university, Guangzhou, China

Work Experience:
2016/07~now: Assistant professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences (CAS), China

Reasech interests:
Nanotoxicity

Three to Five selected publications (11pt Times):

[1] Ma J, Li R, Liu Y, Qu G, Liu J, Guo W, Song H, Li X, Liu Y, Xia T, Yan B, Liu S.* Carbon nanotubes disrupt iron homeostasis and induce anemia of inflammation through inflammatory pathway as a secondary effect distant to their portal-of-entry. Small. 2017,13(15). 1603830
[2] Ma J, Li R, Qu G, Liu H, Yan B, Xia T, Liu Y, Liu, S.* Carbon nanotubes stimulate synovial inflammation by inducing systemic pro-inflammatory cytokines. Nanoscale. 2016, 8(42):18070-18086.
[3] Ma J, Liu R, Wang X, Liu Q, Chen Y, Valle R, Zuo Y, Xia T*, and Liu S*. Crucial Role of Lateral Size for Graphene Oxide in Activating Macrophages and Stimulating Pro-inflammatory Responses in Cells and Animals. ACS Nano. 2015. 9(10):10498-10515.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

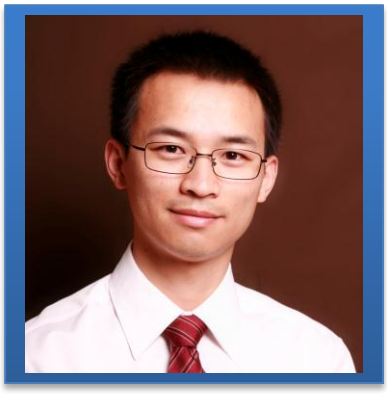
Dr, Guangbo Qu
State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, P.R.China
Tel. (010) 62849129
Fax. (010) 62849129
E-mail: gbqu@rcees.ac.cn

Dr. Guangbo Qu is Associate Professor of Environmental Chemistry at Research Center for Eco-environmental Science (RCEES), Chinese Academy of Sciences. He obtained a PhD degree from RCEES in 2011, and carried out postdoctoral research work at the Indiana University and Miami University, USA, from 2013.12-2015.05. His major research interests are environmental analytical chemistry and environmental molecular toxicology. Current research directions include (1) developing high throughput multiple target assay for the screening of environmental contaminants; (2) identification of main toxic pollutant in environmental compartments using effect-directed analysis; (3) elucidating the mechanism underlying the biological effect of nanomaterials.

Five selected publications:

[1] Qu, G. B.; Liu, S. J.; Zhang, S. P.; Wang, L.; Wang, X. Y.; Sun, B. B.; Yin, N. Y.; Gao, X.; Xia, T.; Chen, J. J.; Jiang, G. B., *ACS Nano* **2013,** *7*, (7), 5732-5745.
[2] Qu, G. B.; Shi, J. B.; Wang, T.; Fu, J. J.; Li, Z. N.; Wang, P.; Ruan, T.; Jiang, G. B., *Environ. Sci. Technol.* **2011,** *45*, (11), 5009-5016.
[3] Qu, G. B.; Zhang, C. W.; Yuan, L.; He, J. Y.; Wang, Z.; Wang, L. X.; Liu, S. J.; Jiang, G. B., *Nanoscale* **2012,** *4*, (7), 2239-2244.
[4] Qu, G. B.; Bai, Y. H.; Zhang, Y.; Jia, Q.; Zhang, W. D.; Yan, B., *Carbon* **2009,** *47*, (8), 2060-2069.
[5] Qu, G. B.; Liu, A. F.; Wang, T.; Zhang, C. L.; Fu, J. J.; Yu, M.; Sun, J. T.; Zhu, N. L.; Li, Z. N.; Wei, G. H.; Du, Y. G.; Shi, J. B.; Liu, S. J.; Jiang, G. B., *Environ. Sci. Technol.* **2013,** *47*, (9), 4760-4767.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology



Prof. Qian Liu

Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences
18 Shuangqing Road, Haidian, Beijing 100085, China
Tel. (86) 10-62849124
Fax. (86) 10-62849339
E-mail: qianliu@rcees.ac.cn
Personal website: www.rcees.ac.cn

Qian Liu is a Professor at Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences. He is also a Professor at Univeristy of Chinese Academy of Sciences. He obtained his Ph.D. in analytical chemistry from Hunan University in 2009. He has received the National Science Fund for Excellent Young Scholars of China and the Chinese Chemical Society Award for Outstanding Young Chemist. He has published 74 papers in SCI-indexed journals. His current research interests include the development of new analytical methods for trace levels of environmental pollutants and the use of stable isotopes to study the process and trace the sources of pollutants.

Three to Five selected publications:

[1] Dawei Lu, Qian Liu*, Tuoya Zhang, Yong Cai, Yongguang Yin, Guibin Jiang*, Stable silver isotope fractionation in the natural transformation processes of silver nanoparticles, ***Nature Nanotechnology***, 2016, 11, 682-686.

[2] Lihong Liu, Bin He, Qian Liu*, Zhaojun Yun, Xueting Yan, Yanmin Long, Guibin Jiang*, Identification and accurate size characterization of nanoparticles in complex media, ***Angewandte Chemie International Edition***, 2014, 53, 14476-14479.

[3] Qian Liu, Jianbo Shi, Jianteng Sun, Thanh Wang, Lixi Zeng, Guibin Jiang*, Graphene and graphene oxide sheets supported on silica as versatile and high-performance adsorbents for solid-phase extraction, ***Angewandte Chemie International Edition***, 2011, 50, 5913 –5917.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor **, Tiangang LUAN**

School of Life Sciences, Sun Yat-sen Universiry, Guangzhou, Guangdong, China.
Tel. (8620) 84112958
Fax. (8620) 84113745
E-mail: cesltg@mail.sysu.edu.cn

Professor Tiangang Luan obtained his Bachelor of Science in chemistry from Jilin University, and his masters and doctorate degrees from Sun Yat-senUniversity. He has been teaching at Sun Yat-sen University since 2000 as a lecturer then as an associate professor in 2002 and as a Professor in 2007. He has subsequently served as a Visiting Scholar at the Waterloo University, Hong Kong Baptist University and as a Senior Research Associate and Research Fellow in City University of Hong Kong. His current research involves the analysis, toxicology and biodegradation studies of organic compounds in environment and ecology. Dr Luan has more than 110 original research articles in refereed international journals. He has considerable experience in undergraduate and postgraduate teaching, and has supervised more than 50 students at the BSc, MPhil and PhD levels in environmental science and ecology.

Slected publications:

[1] Lihua Yang, Qiao Cheng, Nora Tam, Li Lin, Weiqi Su, Tiangang Luan*. *Contributions of abiotic and biotic processes to the aerobic removal of phenolic endocrine-disrupting chemicals in a simulated estuarine aquatic environment. Environmental Science & Technology,* **50**, 4324 (2016).

[2] Jiewei Deng, Yunyun Yang, Mingzhi Xu, Xiaowei Wang, Li Lin, Zhong-Ping Yao, Tiangang Luan*. *Surface-Coated Probe Nanoelectrospray Ionization Mass Spectrometry for Analysis of Target Chemicals in Individual Small Organisms and Single Cells*. *Analytical Chemistry*, **87**, 9923(2000).

[3] Lijuan Luo, Xueying Lai, Baowei Chen, Li Lin, Ling Fang, Nora F. Y. Tam, Tiangang Luan*. *Chlorophyll catalyse the photo-transformation of carcinogenic benzo[a]pyrene in water. Scientific Reports.* **5**, 12776 (2015).

[4] Ke Yuan, Xiaowei Wang, Li Lin, Shichun Zou, Yan Li, Qingshu Yang, Tiangang Luan*****. *Characterizing the parent and alkyl polycyclic aromatic hydrocarbons in the Pearl River Estuary, Daya Bay and Northern South China Sea: influence of riverine input*. *Environmental pollution,* **199**, 66 (2015).

[5] Shusheng Luo, Baowei Chen, Li Lin, Xiaowei Wang, Nora Fung-Yee Tam, Tiangang Luan*****. *Pyrene degradation accelerated by constructed consortium of bacterium and microalga: Effects of degradation products on the microalgal growth. Environmental Science & Technology*, **48,** 13917 (2015)

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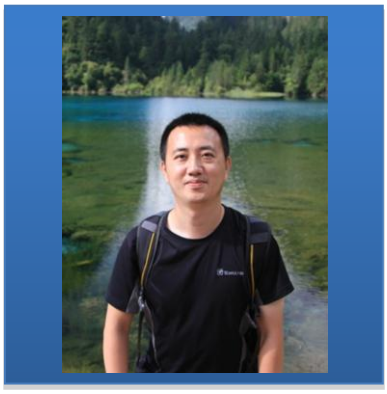

Dr. Ming Xu

Research Center for Eco-Environmental Sciences/State Key Laboratory of Environmental Chemistry and Ecotoxicology/Environmental Pollution and Health Impact, CAS, Beijing, China
Tel. (0086) 18801056723
E-mail: mingxu@rcees.ac.cn
Personal website:
http://et.rcees.ac.cn/index.php?m=content&c=index&a=show&catid=33&id=293

Scientific Degrees:
2006/09~2011/06: PhD, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen, China
2002/09~2006/06: Bachelor, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen, China

Work Experience:
2016/01~Now: Associate professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences (CAS), China
2014/02~2015/12: Assistant professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences (CAS), China
2011/09~2013/12: Postdoctor, Centre national de la recherche scientifique (CNRS), France

Self-assessment:
My research interest is to explore the biological and toxicological mechanisms of (1) micro/nanoparticles and (2) heavy metals and evaluate their environmental and health risks. I have published 15 peer-reviewed SCI papers as the first and communication author. These published papers have been cited for over 250 times by other scientists.

Three to Five selected publications (11pt Times):

[1] Zhu, J., Xu, M., Gao, M., Zhang, Z., Xu, Y., Xia T., Liu, S. *Graphene Oxide Induced Perturbation to Plasma Membrane and Cytoskeletal Meshwork Sensitize Cancer Cells to Chemotherapeutic Agents*. *ACS Nano*, **11**, 2637 (2017).

[2] Xu, M., Zhu, J., Wang, F., Xiong, Y., Wu, Y., Wang, Q., Weng, J., Zhang, Z., Chen, W., Liu, S. *Improved In Vitro and In Vivo Biocompatibility of Graphene Oxide through Surface Modification: Poly(Acrylic Acid)-Functionalization is Superior to PEGylation. ACS Nano*, **10**, 3267 (2016).

[3] Xu, M., Yang, L. M., Wang, Q. Q. A way to probe the microenvironment of free sulfhydryls in intact proteins with a series of monofunctional organic mercurials. *Chemistry - A European Journal*, **18**, 13989 (2012).

[4] Xu, M., Yan, X. W., Xie, Q. Q., Yang, L. M., Wang, Q. Q. *Dynamic labeling strategy with ^{204}Hg-isotopic methylmercurithiosalicylate for absolute peptide and protein quantification. Analytical Chemistry*, **82**, 1616 (2010).

Assistant professor: Ming Gao

State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085,
Phone number: 0086-15201583069
Fax: 0086-010-62849050
E-mail: mingao@rcees.ac.cn

Education and professional affiliation

2014.7-present: assistant professor, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

2011.9-2014-7: Ph.D., Pharmaceutical engineering, School of Chemical Engineering and Technology, Tianjin University & Beijing Institute of Radiation Medicine

2007.8-2010.7: M.S., immunology, Beijing Institute of Basic Medical Sciences

2003.9-2007.7: B.S., Bioengineering, Department of Bioengineering, Jilin University

Research Topics

My research interest is to disclose the hearth risks and related molecular mechanisms of environmental pollutions, including heavy metals, nonomaterilas and so on. And I am devoting to reveal the key moleculars and signaling pathways which involved in mediating environmental pollution-induced cytotoxicity, providing effective information and theory basis for the understaning and treatment of environmental toxicties. My results found that some novel moleculars, including miRNA, lncRNA and histone modification proteins, are also contributed a lot to the cytotoxicities of environmental pollutions. My main conclusions are following: miR-214 was downregulated upon arsenite treatment to protect erythroid cells against oxidative stress through directly targeting ATF4 and EZH4; lncRNA ODRUL was involved in silver nanoparticle-induced cytotoxicy through PI4Kα/JNK, AKT pathway; lncRNA MT1DP was specifically response to cadmium cytotoxicity and promoted cell death through regulating RhoC/CCNs pathway and its parental gene MT1H.

Publications:

[1] Ming Gao, Beibei Zhao b, Minjun Chen, Yun Liu, Ming Xu, Zhe Wang, Sijin Liu, Chengdong Zhang, Nrf-2-driven long noncoding RNA ODRUL contributes to modulating silver nanoparticle-induced effects on erythroid cells. Biomaterials. 2017,130:14-27.

[2] Ming Gao, Yun Liu, Yue Chen, ChunyangYin, Jane-JaneChen, SijinLiu, miR-214 protects erythroid cells against oxidative stress by targeting ATF4 and EZH2. FREE RADICAL BIO MED.2016, 92:39-49.

[3]. Ming Gao, Yi-Qun Zhan, Miao Yu, Chang-Hui Ge, Chang-Yan Li, Jian-Hong Zhang, Xiao-Hui Wang, Zhi-Qiang Ge and Xiao-Ming Yang, Hepassocin Activates the EGFR/ERK Cascade and Induces Proliferation of L02 Cells through the Src kinase-Dependent Pathway. Cell Signal. 2014, 26:2161–2166

[4]. Ming Gao, Xiaoguang Li, Wen Dong, Rui Jin, Hanghang Ma, Pingxun Yang, Meiru Hu, Yi Li, Yi Hao, Shengtao Yuan, Junjian Huang and Lun Song. Ribosomal protein S7 regulates arsenite-induced GADD45α expression by attenuating MDM2-mediated GADD45α ubiquitination and degradation. Nucleic Acids Res. 2013, May 1;41(10):5210-22

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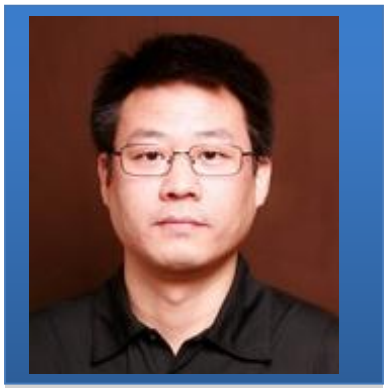

Associate Professor, Bin WAN

State Key Laboratory of Environmental Chemistry
and Ecotoxicology
Research Center for Eco-Environmental Sciences
Chinese Academy of Sciences
Beijing 100085, China
Tel. (086) 6284 9338
Fax. (086) 6284 9685
E-mail: Binwan@rcees.ac.cn

I graduated from Nankai University, China, in 1997 with a bachelor degree in environmental sciences. After that, I obtained a master degree in the institute of environmental health and Engineering, Chinese Academy of Preventive Medicine. In 2000, I joined the University of Tennessees, Knoxville to pursue a Doctoral degree in the department of Ecology and Evolutionary Biology & Center for Environmental Biotechnology. And then, I did post-doc research in the department of Comparative medicine, Univeristy of Tennessee, Knoxville. I joined the Research Center for Eco-environmental Sciences, Chinese Academy of Sciences in 2007. My research interests mainly focused on the toxicological study of environmental pollutants including nanomaterials, heavy metals and persistent organic toxic substances, by employing microarray, as well as molecular and cellular techniques to understand the side effects of pollutants and underlying mechanisms. My works have generated over 30 publications in SCI journals, including *Environmental Health Perspectives*, *Small*, *Environmental Science & Technology*, and *Nanotoxicology*.

Three to Five selected publications (11pt Times):

[1] Xuejing Cui, Bin Wan*, *Scientific Reports* **7**:1518(2017).
[2] Xuejing Cui, Bin Wan*, *Small* 12:5998-6011(2016).
[3] Xuejing Cui, Bin Wan*, *Environmental Science & Technology* 50:12473-12483(2016).
[4] Ping-Xuan Dong, Bin Wan*, *Nanotoxicology* 7(5):1028-1042(2013).
[5] Ping-Xuan Dong, Bin Wan*, *Nanotoxicology* 6(3):288-303(2012).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Jun LI

Department of Chemistry, Tsinghua University
Beijing 100084, China
Tel. (86-10) 6279 5381
E-mail: junli@tsinghua.edu.cn
Personal website: www.junlilab.org

Prof. Jun Li received a Ph.D. degree in Physical Chemistry from Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences in 1992. He was a postdoctoral researcher at the Department of Chemistry, University of Siegen (Germany) and at the Department of Chemistry, The Ohio State University (USA) from 1993 to 1997. He worked as a Research Scientist at The Ohio State University from 1997 to 2000 and then became a staff member at the Pacific Northwest National Laboratory (PNNL, USA) in 2001, where he was appointed as a Senior Research Scientist and later promoted to a Chief Scientist. He was also an affiliated full professor at University of Idaho and Washington State University. Since 2007 he has been a ChangJiang Chair Professor at the Department of Chemistry, Tsinghua University, China.
Prof. Li has some 30 years experience in teaching and research in computational chemistry and theoretical heavy-element chemistry. He has published over 200 peer-reviewed papers and six book chapters, including more than 60 articles in high-impact journals (Science, Nature, Proc. Nat. Acad. Sci. USA, Nature Chem., Nature Mat., Nature Commun., Angew. Chem. Int. Ed., J. Am. Chem. Soc., Chem. Sci. and Acc. Chem. Res.). He has presented more than 100 invited talks and seminars and organized a dozen of international conferences. His research interests include computational catalysts, theoretical nanocluster chemistry, and theoretical heavy-element (actinide and lanthanide) chemistry. His recent research works focus on computational modeling of catalytic and energy materials, ab initio theoretical investigations of electronic structures and spectra of transition-metal complexes and nanoclusters, and relativistic quantum chemical studies of lanthanide and actinide compounds of environmental significance.

Three selected publications:

[1] B.-T. Qiao, A.-Q. Wang, X.-F. Yang, L. F. Allard, Z. Jiang, Y.-T. Cui, J.-Y. Liu, J. Li, T. Zhang, *Single-Atom Catalysis of CO Oxidation Using Pt1/FeOx*, *Nature Chem.* **3(8)**, 634-641 (2011).
[2] Y.-G. Wang, Y. Yoon, V.A. Glezakou, J. Li, R. Rousseau, *The Role of Reducible Oxide-Metal Cluster Charge Transfer in Catalytic Processes: New Insights on the Catalytic Mechanism of CO Oxidation on Au/TiO2 from Ab Initio Molecular Dynamics*, *J. Am. Chem. Soc.* **135(29)**, 10673-10683 (2013).
[3] Y.-G. Wang, D.-H. Mei, V.-A. Glezakon, J. Li, R. Rousseau, *Dynamic Formation of Single-Atom Catalytic Active Sites on Ceria-Supported Gold Nanoparticles*, *Nature Commun.* **6**, 6511 (2015).

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Professor, ignacio L. GARZÓN

Instituto de Física
Universidad Nacional Autónoma de México
Ciudad Univerisaria, 04510 México, D. F., Mexico
Tel. (52) 55 5622 5147
Fax. (52) 55 5622 5020
E-mail: garzon@fisica.unam.mx
Personal website: www.fisica.unam.mx/garzon

Prof. Garzón is a Professor of Physics at Universidad Nacional Autónoma de México (UNAM) and is recognized as one of the leading theoreticians in Mexico in the area of numerical modeling of nanosystems and atomic clusters. His area of research includes theoretical studies on the shape and morphology of bare and ligand-protected metal clusters in order to predict and understand their electronic, optical, and other physical properties, combining genetic algorithms and many-body potentials (to perform global structural optimizations), with first-principles density functional theory (to confirm stability and energy ordering of the local minima); chirality in metal clusters and chirality index calculations; and vibrational and thermal properties of metal nanoparticles. He has published 77 journal papers in high-impact journals such as Journal of the American Chemical Society, Physical Review Letters, Chemical Society Reviews, the Journal of Physical Chemistry, and Physical Review B, among others. He has been cited ~ 4000 times and his H index is equal to 33. **Prof. Garzón received a Ph. D. in Physics from UNAM in 1985, and occupied a postdoctoral** position at the Department of Chemistry of the University of California, San Diego, USA between 1985 and 1986. He has been Visiting Professor at research institutions of USA, Italy, France, and Spain. He is currently an active member of the International Advisory Committee of the International Symposium on Small Particles and Inorganic Clusters (ISSPIC), and of the International Conference on Nanostructured Materials (ICNM). Prof. Garzón is member of Mexican Academy of Sciences.

Five selected publications:

[1] A. Sánchez-Castillo, C. Noguez, and I.L. Garzón, "On the Origin of the Optical Activity Displayed by Chiral Ligand-Protected Metallic Nanoclusters" J. Am. Chem. Soc, 132 1504 (2010).

[2] C. Noguez and I.L. Garzón, "Optically Active Metal Nanoparticles," Chemical Society Reviews, 38 75 (2009).

[3] X. López-Lozano, L.A. Pérez, and I.L. Garzón, "Enantiospecific adsorption of chiral molecules on chira Au clusters," Physical Review Letters, 97 233401 (2006).

[4] I.L. Garzón, C. Rovira , K. Michaelian, M.R. Beltrán, J. Junquera,P. Ordejón, E. Artacho, D. Sánchez-Portal, and J.M. Soler, "Do Thiols Merely Passivate Gold Nanoclusters ?" Physical Review Letters 85, 5290 (2000).

[5] I.L. Garzón, K. Michaelian, M.R. Beltrán, A. Posada-Amarillas, P. Ordejón, E. Artacho, D. Sánchez-Portal, and J.M. Soler. "Lowest Energy Structures of Gold Nanoclusters" Physical Review Letters, 81, 1600 (1998).

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Prof. Dr. Lionel VAYSSIERES

International Research Center for Renewable Energy, School of Energy & Power Engineering,
Xi'an Jiaotong University, Xi'an, China
Tel. +86 298-266-4665
Fax. +86 298-266-4665
E-mail: lionelv@xjtu.edu.cn
IRCRE website: http://ircre.xjtu.edu.cn

Born in 1968, he obtained his Baccalaureat in Mathematics & Life Sciences in 1986 (Academy of Grenoble, France). He then moved to Paris and studied at the prestigious Université Pierre et Marie Curie where he received a BSc. and a MSc in Chemical Physics and a postgraduate diploma in Inorganic Chemistry in 1989, 1990, and 1991 respectively as well as a PhD in Chemistry in 1995 for his research work on *the Interfacial & thermodynamic growth control of metal oxide nanoparticles in aqueous solutions*. Thereafter, he joined Uppsala University, Sweden as a postdoctoral researcher for the Swedish Materials Consortium on Clusters and Ultrafine Particles to extend his concepts and develop *purpose-built metal oxide nanomaterials* as well as to characterize their electronic structure by x-ray spectroscopies at synchrotron radiation facilities. He has been carried out his research work as a visiting scientist at: the University of Texas at Austin; the UNESCO Centre for Macromolecules & Materials, Stellenbosch University, and iThemba LABS, South Africa; the Glenn T. Seaborg Center, Chemical Sciences Division, at Lawrence Berkeley National Laboratory; Texas Materials Institute; The Ecole Polytechnique Fédérale de Lausanne, Switzerland; the University of Queensland, Australia, and Nanyang Technological University, Singapore. He was an independent scientist at the National Institute for Materials Science, Tsukuba, Japan for 8 years.
He has (co-)authored over 100 publications (75 SCI) in major international journals and book series which have already generated over 10500+ citations since the year 2000 (5000+ since 2012, Google Scholar); Top 1% scientist in Materials Science. All time 8 ISI highly cited papers (5 as first author). He has been interviewed by In-Cites and ScienceWatch (Thomson Reuters) in 2006 for a single-author original research paper cited now over 2750+ times and again in 2010 for another highly cited paper in Chemistry. He has given 375 lectures in 32 countries (186 talks at international conferences and 189 seminars at universities, governmental and industrial research laboratories and institutes) and acted as an organizer, chairman, executive program committee and advisory member for major international conferences (MRS, ACS, ACerS, SPIE, IUPAC, IEEE…).
He is currently a full time 1000-talent scholar Professor at Xi'an Jiaotong University, P.R. China, co-founder and co-director of the *IRCRE-International Research Center for Renewable Energy* (340 articles, 7150 citations, 14 ESI Highly Cited Papers since 2011) funded by NSF China. He is also, since 2003, the founding editor-in-chief of *Int. J. Nanotechnol.*, a referee for over 80 SCI journals as well as major funding agencies in Americas, Europe, Asia, and Africa and a guest scientist at Lawrence Berkeley National Laboratory, Chemical Sciences Division, USA. He received the National Award from China in 2016.

Five selected publications:

[1] J. Su, **L.Vayssieres***, "***A Place in the Sun* for Artificial Photosynthesis?**", *ACS Energy Lett.* ***1***, 121 (2016)
[2] Y. Tachibana*, **L. Vayssieres***, J. R. Durrant, "**Artificial photosynthesis for solar water splitting**", *Nature Photon.* ***6***, 511 (2012)
[3] **L.Vayssieres**[*], C. Persson, J.-H Guo, **"Size effect on the conduction band orbital character of Anatase TiO_2 nanocrystals**", *Appl. Phys. Lett.* ***99***, 183101 (2011)
[4] **L.Vayssieres**[*], C. Sathe, S. M. Butorin, D. K. Shuh, J. Nordgren, J.-H. Guo*, "**One-dimensional quantum-confinement effect in α-Fe_2O_3 ultrafine nanorod arrays**", *Adv. Mater.* ***17***, 2320 (2005)
[5] **L.Vayssieres**[*], M. Graetzel, "**Highly ordered SnO_2 nanorod-arrays from controlled aqueous growth**", *Angew. Chem. Int. Ed.* ***43***, 3666 (2004).

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Dr. Rodolfo ZANELLA
Centro de Ciencias Aplicadas y Desarrollo Tecnológico, Universidad Nacional Autónoma de México, Circuito Exterior S/N, Ciudad Universitaria, A. P. 70-186, Delegación Coyoacán, C.P. 04510, Cd. Mx., Mexico
Tel. (+52) 5556228601
E-mail: rodolfo.zanella@ccadet.unam.mx
Personal website:
www.ccadet.unam.mx/secciones/depar/sub3/matena/semb/RZS.html
and www.ccadet.unam.mx

Rodolfo Zanella is a chemical engineer (1998) by UNAM, he earned a Master's degree in Chemical Engineering (2000) by UNAM and a Ph. D. degree in Process Engineering and Catalysis from the Université Pierre et Marie Curie-Paris VI, France in 2003. After a post-doctoral stay at the Center for Applied Sciences and Technological Development (CCADET), in 2004 he was hired first as research assistant (2006) and then as senior researcher (2009); he was Academic Deputy and currently he is Director of the Center. He is member of the National Research System of Mexico (SNI II). His scientific interests lie in the deposition of monometallic and bimetallic nanoparticles on reducible and non-reducible powder oxides; the synthesis of pure and doped metal oxides; the catalysis focused on exhaust gas reactions (CO oxidation, NO reduction, total oxidation), the production and purification of H_2 (water-gas shift reaction), preferential CO oxidation; the photocatalytic degradation of organic compounds and the photocatalytic production of hydrogen. He has published about 90 research papers that have been cited about 3300 times (H index 26), 5 book chapters and has been in charge of 18 founded projects. He has been recognized twice by Elsevier for being the first author of one of the most cited articles in Chemical Engineering Journals, and by UNAM with the National University Award of Distinction for Young Scientist, UNAM, and for being one of the most cited researchers (at UNAM) in the field of chemistry.

Five selected publications

[1] L. A. Calzada, S. Collins, C. W. Han, V. Ortalan, R. Zanella, Synergetic Effect of Bimetallic Au-Ru/TiO_2 Catalysts for Complete Oxidation of Methanol, Applied Catalysis B 207 (2017) 79-92,

[2].A. Aguilar-Tapia, R. Zanella, C. Calers, C. Louis, L. Delannoy, Synergetic effect in Ir-Au/TiO_2 catalysts in the total oxidation of propene: Influence of the activation conditions, Phys. Chem. Chem. Phys., 17 (2015), 28022-28032

[3] A. Aguilar-Tapia, L. Delannoy, C. Louis, Ch. W. Han, V. Ortalan, R. Zanella, Selective Hydrogenation of 1,3-butadiene over Bimetallic Au-Ni/TiO_2 Catalysts Prepared by Deposition-Precipitation with Urea, Journal of Catalysis 344 (2016) 515–523

[4] A. Sandoval, C. Louis, R. Zanella, Improved Activity and Stability in CO Oxidation of Bimetallic Au-Cu/TiO_2 Catalysts Prepared by Deposition-Precipitation with Urea Applied Catalysis B: Environmental, 140-141 (2013) 363-377

[5] A. Sandoval, A. Aguilar, C. Louis, A. Traverse, R. Zanella. Bimetallic Au-Ag/TiO_2 Catalyst Prepared by Deposition-Precipitation. High Activity and Stability in CO Oxidation. Journal of Catalysis (2011)

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Qihua YANG

State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, Liaoning, China
Tel. (86) 41184379552
Fax. (86) 4114694447
E-mail: yangqh@dicp.ac.cn
Personal website: www.hmm.dicp.ac.cn

EDUCATION AND RESEARCH EXPERIENCE

BSc.(1991), Yantai Normal College; MSc. (1994), Northeast Normal University; Ph. D. (1997), Northeast Normal University; Post-Doctoral Fellow (1997.08-1999.11), State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics; Post-Doctoral Fellow (1999.12-2001.07), LCOMS-CNRS/CPE, France; Visiting researcher (2001.08-2003.03), Toyota Central R&D Labs. Inc., Japan; Professor (2003.04-), State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences.

RESEARCH INTEREST

My research interests focus on the design and synthesis of organic-inorganic porous materials for heterogeneous catalysis, especially for heterogeneous asymmetric catalysis. Recently, we realized the asymmetric catalysis in nanoreactor by encapsulating the molecular catalysts in the nanocages of the mesoporous silicas. The asymmetric catalysis in nanoreactor takes the advantages of both homogeneous and heterogeneous catalysis because the molecular catalysts confined in the nanoreactor keep their intrinsic properties as in homogeneous solution. For the first time, the cooperation activation effect of the molecular catalysts in nanoreactor was observed and this effect could be significantly intensified in the confined space of nanoreactors, which results in an enormous enhancement in the catalytic activity and selectivity. This provides a new strategy for the preparation of high-performance solid chiral catalysts for asymmetric catalysis.

AWARDS

"China Young Women Scientists' Awards", 2008, Beijing

The 4th "National Catalysis Prize for Young Scientists", 2012, Beijing

Selected publications

[1] Y. Yang, X. Liu, X. B. Li, J. Zhao, S. Y. Bai, J. Liu, Q. H. Yang, *Angew. Chem. Int. Ed.* **51**, 9164 (2012).
[2] B. Li, S. Y. Bai, X. F. Wang, M. M. Zhong, Q. H. Yang, C. Li, *Angew. Chem. Int. Ed.* **51**, 11517-11521 (2012).
[3] X. M. Zhang, Y. P. Zhao, S. T. Xu, Y. Yang, J. Liu, Y. X. Wei, Q. H. Yang, Nature Commun. **5**, Article number: 3170 (2014).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Luis Edmundo FUENTES-COBAS

Materials Physics Department
Advanced Materials Research Center
Miguel de Cervantes 120, Complejo Industrial Chihuahua
CP 31136, Chihuahua, Chih. México
Tel. (+52 614) 439 11 59
Fax. (+52 614) 439 11 59
E-mail: luis.fuentes@cimav.edu.mx
Personal website: blogs.cimav.edu.mx/luis.fuentes

Dr. Fuentes-Cobas obtained his B. Sc. (1970), M- Sc. (1977) and Ph.D. (1982) in Solid State Physics from Havana University, Cuba. He received a post-doc on neutron texture analysis at the Joint Institute for Nuclear Research, Dubna, Russia (1983 - 85).

In Cuba he worked as Professor and Senior Researcher at Havana University and at the Cuban Academy of Sciences. He was Head of the General Physics Dept. at Havana University, Secretary of the National Commission for Scientific Degrees, Vice-President of the National Commission of Physics Teaching and Head of the Solid State Section of the Cuban Physical Society.

In Mexico he works, since 1997, at the Materials Physics Department, Advanced Materials Research Center, Chihuahua. His teaching and research activities have been centered on electromagnetic theory; materials structure analysis by synchrotron light diffraction-scattering and the structure-properties relationship. He has made original contributions on the representation and prediction of piezo- and magnetoelectric properties of bulk and nanostructured materials. Dr. Fuentes-Cobas coordinates the Materials World Modules-Mexico scientific education program (http://mwm.cimav.edu.mx) and the web page of the Material Properties Open Database project (http://mpod.cimav.edu.mx).

He has been awarded in Russia (Prize for Applied Research, Joint Institute for Nuclear Research, Dubna, 1983), Cuba (National Reward, Cuban Academy of Science, 1997), Spain (Distinguished Visitor, Complutense University, Madrid, 2008) and Mexico (State First Prize of Science and Technology, Chihuahua, 2012).

Selected publications:

[1] J. Silva, A. Reyes, H. Esparza, H. Camacho, L. Fuentes: *$BiFeO_3$: A Review on Synthesis, Doping and Crystal Structure*. Integr. Ferroelectr. **126**, 47 (2011). [most read article of journal].
[2] L. Fuentes-Cobas, A. Muñoz-Romero, M. E. Montero-Cabrera et al: *Predicting the Coupling Properties of Axially-Textured Materials.* Materials **6**, 4967 (2013).
[3] L. Fuentes-Cobas, L. Pardo, M. E. Montero-Cabrera et al: *The $0.96(Bi_{0.5}Na_{0.5})TiO_3 - 0.04BaTiO_3$ crystal structure: A high-Q, high-counting statistics synchrotron diffraction analysis*. Crys. Res. Tech. **49**, 190 (2014). [Cover page article].
[4] L.E. Fuentes-Cobas, J.A. Matutes-Aquino, M.E. Botello-Zubiate, et al: *Advances in Magnetoelectric Materials and their Application*. Ch. 3, Vol. 24, Handbook of Magnetic Materials. Ed.: K.H.J. Buschow. Elsevier (2015).
[5] L. E. Fuentes-Cobas, D. Chateigner, M. E. Fuentes-Montero et al: *The Representation of Coupling Interactions in the Material Properties Open Database (MPOD).* Advances in Applied Ceramics (2017) dx.doi.org/10.1080/17436753.2017.1343782.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Prof. An-Hui Lu

Affiliations: State Key Laboratory of Fine Chemicals, School of Chemical Engineering, Dalian University of Technology, Dalian 116024, P.R. China.
Tel. +86-411-84986112
Fax. +86-411-84986112
E-mail: anhuilu@dlut.edu.cn
Personal website: http://finechem.dlut.edu.cn/lu-anhui/index.htm

An-Hui Lu received his Ph.D. degree from the Institute of Coal Chemistry, Chinese Academy of Sciences in 2001. He worked as Postdoctoral fellow and Alexander von Humboldt fellow in the group of Prof. F. Schüth at the Max-Planck-Institute für Kohlenforschung. In 2005, he was promoted to group leader at the same institute. He is currently a professor at the State Key Laboratory of Fine Chemicals, School of Chemical Engineering, Dalian University of Technology since 2008. Since 2015, he has been appointed as the Dean of the School of Chemical Engineering, vice director of the State Key Laboratory of Fine Chemicals since 2017 . He received the Brian Kelly Award (2006), awards of New Century Excellent Talents in University of China (2009), National Science Fund for Distinguished Young Scholars of China (2012); selected as Young Leading Talents of Scientific and Technological Innovation (2014) by the Ministry of Science and Technology of the P. R. China, Cheung Kong Scholar by the Ministry of Education of China (2015), Leading Talents of National High-level Personnel of Special Support Program (2015). He has authored and co-authored more than 170 papers with citation over 10,000 times. He has been awarded as the Most Cited Chinese Researchers 2014 in the field of Chemistry. He serves as Editorial Board "ChemCatChem", "Scientific Reports", "ChemistrySelect" and "Science China Materials". His research interests include synthesis of porous materials for heterogeneous catalysis, adsorption, energy storage and conversion.

Selected publications:

[1] L. Shi, D. Wang, W. Song, D. Shao, W.-P. Zhang, A.-H. Lu, *ChemCatChem*, **9**, 1788 (2017).
[2] B. He, W.-C. Li, C. Yang, S.-Q. Wang, A.-H. Lu, *ACS Nano* **10**, 1633 (2016).
[3] L. Shi, G.-M. Deng, W.-C. Li, S. Miao, Q.-N. Wang, W.-P. Zhang, A.-H. Lu, *Angew. Chem. Int. Ed.* **54**, 13994 (2015).
[4] G.-P. Hao, Z.-Y. Jin, Q. Sun, X.-Q. Zhang, J.-T. Zhang, A.-H. Lu, *Energy Environ. Sci.* **6**, 3740 (2013).
[5] S. Wang, W. –C. Li, G. –P. Hao, Y. Hao, Q. Sun, X. –Q. Zhang, A. –H. Lu, *J. Am. Chem. Soc.* **133**, 15304 (2011).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Professor, Sijin Liu

Research Center for Eco-Environmental Sciences, the Chinese Academy of Sciences, Beijing, China
Tel. (8610) 62849330
Fax. (8610) 62849330
E-mail: sjliu@rcees.ac.cn
Institute website: www.rcees.ac.cn

Dr. Sijin Liu is currently a professor at the Research Center for Eco-Environmental Sciences, the Chinese Academy of Sciences (CAS). He received Ph.D from the Institute of Developmental Biology and Genetics, CAS, in 2004. Thereafter, he received the postdoc training in hematology and oncology at MIT and Harvard Medical School from 2004 to 2008. Afterwards, he became an instructor at Tufts Medical School from in 2008. Dr. Liu moved to the current position at the end of 2009. Dr. Liu is a recipient of the NSFC "Outstanding Yong Scientist" award and CAS "One Hundred Talent Program" award, and is also the chief scientist of "National Basic Research Program of China (973 Program)". Research interests: (1) the mechanisms responsible for environmental pollutant-mediated oncogenic effects; (2) nanotoxicity and envrionmnetal nanoimpact.

Five selected publications:

1. Gao, M., Zhao, B., Chen, M., Liu, Y., Xu, M., Wang, Z., Liu, S.*, Zhang, C.* (2017) Nrf-2-driven long noncoding RNA ODRUL contributes to modulating silver nanoparticle-induced effects on erythroid cells. Biomaterials.130:14-27.
2. Zhu, J., Xu, M.,* Gao, M., Zhang, Z., Xu, Y., Xia, Y., Liu, S.* (2017) Graphene Oxide-Induced Perturbation to Plasma Membrane and Cytoskeletal Meshwork Sensitize Cancer Cells to Chemotherapeutic Agents. ACS Nano. 2017, DOI: 10.1021/acsnano.6b07311.
3. Ma, J., Li, R., Liu, Y., Qu, G., Liu, J., Guo, W., Song, H., Li, X., Liu, Y., Xia, T., Yan, B., Liu, S.* (2017) Carbon nanotubes disrupt iron homeostasis and induce anemia of inflammation through inflammatory pathway as a secondary effect distant to their portal-of-entry. Small. 2017. 13(15). doi: 10.1002/smll.201603830.
4. Chen, Y., Wu, Y., Sun, B., Liu, S.,* Liu, H.* (2017) Two-dimensional nanomaterials for cancer nanotheranostics. Small. 2017. doi: 10.1002/smll.201603446.
5. Chen, Y., Xu, M., Zhang, J., Ma, J., Gao, M., Zhang, Z.*, Xu, Y., Liu, S.* (2017) Genome-wide DNA methylation variations upon engineered nanomaterials and their implications in nanosafety assessment. Adv Mater. 29(6): 1604580.

6.

Professor, Rongming WANG

Beijing Key Laboratory for Magneto-Photoelectrical Composite and Interface Science, School of Mathematics and Physics, University of Science and Technology Beijing, Beijing 100083, P. R. China
Tel. +86 (10) 6233 2354
E-mail: rmwang@ustb.edu.cn
Personal website: http://wang-lab.ustb.edu.cn

Rongming WANG received his Bachelor and Master's Degrees in Physics from Peking University and Ph. D. in Materials Science from Beijing Institute of Aeronautical Materials, China. In 2004-2005, he was a visiting scholar in University of California, Berkeley. Then he joined Beihang University as a Professor in physics. Currently, he is a professor in University of Science and Technology Beijing, Dean of School of Mathematics and Physics and Director of Beijing Key Laboratory for Magneto-Photoelectrical Composite and Interface Science. His research interests include magnetic nanomaterial, transmission electron microscopy and interface science.

Prof. Rongming Wang has published over 180 articles including ***Phys. Rev. Lett.***, ***Adv. Mater.***, ***J. Am. Chem. Soc.***, ***Angew. Chim. Int. Ed.***, ***Nano Lett.*** etc. and presented over 60 invited talks in international and national conferences, universities and institutes. The papers have been cited over 5,600 time citations by SCI journals and citation H factor of 41. He has won several awards including National Prize for Natural Sciences, Scientific Chinese Prize for People of the Year 2012, State Council Expert for Special Allowance, etc.

Five selected publications:

[1] R. M. Wang*, et. Al., *Phys. Rev. Lett.* **100**, 017205 (2008).
[2] Heng Li, Rongming Wang* and co-authors, *Adv. Mater.* **22**, 1237 (2010).
[3] Wei Liu, Rongming Wang* and co-authors, *Nano Lett.* **11**, 2983 (2011).
[4] Xianfu Wang, Rongming Wang* and co-authors, *Angew. Chem. Int. Ed.* **53**, 1849 (2014).
[5] Rongming Wang (Editor in chief) and co-authors, *Progress in Nanoscale Characterization and Manipulation*, Peking University Press (2017).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Alejandro Pérez Larios

Universidad de Guadalajara, Centro Universitario de los Altos,
Engineering Department, Lab. Nanocatalysis, Tepatitlan de Morelos,
Jalisco.
Tel. (378) 782-8033
E-mail: alarios@cualtos.udg.mx

Professor of Chemistry and Balance of matter and energy, Guadalajara of University, Campus Los Altos, Tepatitlan de Morelos, Jalisco, Mexico.
Fellow, National system of researchers (SNI), Program for professional Teacher Development (PRODEP), member of the academy of catalysis, member of the Mexican Hydrogen Society.

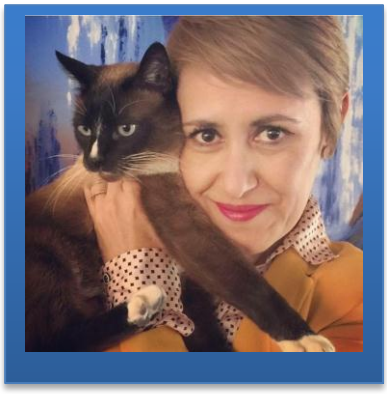
Pérez Larios is a profesor of Agroindustrial Engineering and of Engineering in Livestock Systmes at the University Center Los Altos of the Guadalajara University. Academic degree of Chemical Engineer (CUCEI/ Guadalajara of University), Master of Sciece in Chemical Engineering (UMSNH) and Doctorate in Sciences (Chemistry) in the (UAM) and posdoctoral stay in the Center of Applied Sciences of the UNAM, with the research of catalytic materials, with the specialty in Advanced Processes of Oxidation for the treatment of residual also conducts research in the fields of (i) environmental nanocatalysis and photocatalysis for water treatment, (ii) Advanced Oxidation Processes for the removal of emerging pollutants, (iii) Engineering and conversion of solar energy, (iv) production of fuels (Biodiesel, bioethanol and hydrogen), (v) air treatment and purification, (vi) Nanomedicine catalytic.

It has 7 theses concluded in the área of wáter treatment of milk industries and pigs farms and 5 theses in progress with topics wáter treatment and biodiesel production.

Three to Five selected publications (11pt Times):

[1] Perez-Larios A., Lopez R., Hernandez-Gordillo A., Tzompantzi F., Gomez R., Torres-Guerra L.M., Improved hydrogen production from wáter splitting using TiO2-ZnO mixed oxides photocatalysts, Fuel, **100**, 139-143 (2012).
[2] Cervantes-Gaxiola, M.E., Arroyo-Albiter, M., Perez-Larios A., Balbuena P.B., Espino-Valencia J., Experimental and theorical study of NiMoW, NiMo and NiW sulfide catalysts supported on an AlTiMg mixed oxide during the hydrodesulfuraization of dibenzothiophene. Fuel **113**, 733-743 (2013).
[3] Pillai, S.C., Stangar U.L., Byrne J.A., Perez-Larios A., Dionysiou D.D., Photocatalysis for disinfection and removal of contaminants of emerging concern. Chem. Eng. J, **261**, 1-2 (2015).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology



Dra. Patricia Amezága Madrid

Centro de Investigación en Materiales Avanzados, S.C. Miguel de Cervantes 120, Complejo Industrial Norte. Departamento de Física de Materiales. Laboratorio de Películas Delgadas. Chihuahua, Chih., México.
Tel. (614) 4394872
Ext. 4872
E-mail: patricia.amezaga@cimav.edu.mx

Doctor in Environmental Science and Technology, professional certificate 4598314. Master in Food Science and Technology, professional certificate 4598313. Chemist Bacteriologist Parasitologist, professional certificate 4598312. Level SNI 1. 41 articles published in International Scientific Journals. 2 book chapter. 485 citations. 1 Patent Title. 7 Patent Registration in Mexico. 2 Published patent registrations in the United States. 68 Scientific papers presented at International Congresses. Direction of Thesis: 12 Thesis of Degree, 7 Thesis of Master, 7 Thesis of Doctorate. 4 Participations in collaboration in Projects of Linkage with the industry. 10 Collaborative Participation in BasicScience Projects.

[1] Sáenz-Trevizo A *et al, Journal of Alloys and Compounds*. 2014; 614:S375-S381.
[2] Sáenz-Trevizo A *et al M. Materials Characterization*. 2014;98:215-221.
[3] Sáenz-Trevizo A *et al Materials Science in Semiconductor Processing* 2016;45:57-68.
[4] Mario Miki Yoshida *y cols*, Application for patent registered with the Mexican Institute of Industrial Property, Docket number MX/a/2013/015380; folio MX/E/2013/095195.
[5] Lugo-Ruelas M *et al Journal of Alloys and Compounds* 2015;643:S46-S50.
[6] Amézaga-Madrid P *et al, Journal of Alloys and Compounds*. 2010;495:629-633.
[7] Sáenz-Trevizo A *et al, Materials Characterization* 2014; 98:215-221.
[8] Mario Miki Yoshida *y cols*, Centro de Investigación en Materiales Avanzados, S.C. México. Patent register MX/a/2014/007867.
[9] Sáenz-Trevizo A *et al, Materials Science in Semiconductor Processing*, 2016;45:57-68.
[10] Monárrez-Cordero B *et al, Journal of Alloys and Compounds* 2014;586:S520-S525.
[11] Mario Miki Yoshida *y cols*, Centro de Investigación en Materiales Avanzados, S.C. México, Title of Patent No. MX/a/2012/004874.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Ph. D. Blanca Elizabeth Monarez Cordero

Centro de Investigación en Materiales Avanzados S. C., Física de Materiales, Miguel de Cervantes No.120, Chihuahua, Chih., C. P. 31136, Mexico.

Tel. (052) 6141543412
E-mail: tricablan@hotmail.com

INTERNATIONAL CONGRESSES

[1] Synthesis and characterization iron and aluminium oxides for application in the removal of arsenic and fluoride ions. IMRC 2016.
[2] Synthesis and characterization of nanoparticles of iron and titanium oxides for application such as adsorbents of arsenic and fluorine ions. IMCR 2016.
[3] Simulation of evaporation of drop during the formation of nanoparticles By AACVD. ISMANAM 2015.
[4] Theorical and experimental influence of synthesis parameters of AACVD on the microestructural properties of magnetite nanoparticles and its response to the removal efficiency of arsenic. ISMANAM 2014.
[5] Theoretical simulation of the behavior of physical and chemical parameters that are involved in the synthesis of nanoparticles of magnetite by AACVD technique to correlate their effects with the microstructural properties obtained experimentally ISMANAM 2013.

PATENT

Proceso para sintetizar nanopartículas de magnetita mesoporosas y huecas de alta área superficial en un solo paso por la técnica de depósito químico de vapor asistido por aerosol (AACVD)., MX/A/2012/004874, , La presente invención se refiere a la obtención de nanopartículas de magnetita de estructura hueca y mesoporosas, las cuales fueron obtenidas por la técnica depósito químico de vapor asistido por aerosol, utilizando una solución precursora conteniendo una sal orgánica o inorgánica, Registrada (14/07/2016).

Publications

[1] B.E. Monárrez-Cordero P. Amézaga-Madrid P.G. Hernández-Salcedo W. Antúnez-Flores C. Leyva-Porras M. Miki-Yoshida, Journal of Alloys and Compounds, Vol.615, Pag.328-334(2014).

[2] B.E. Monárrez-Cordero P. Amézaga-Madrid W. Antúnez-Flores C. Leyva-Porras P. Pizá-Ruiz M. Miki-Yoshida, Journal of Alloys and Compounds, Vol.586, Pag.520-525 (2014).

[3] Blanca Elizabeth Monárrez-Cordero, Patricia Amézaga-Madrid, César Cutberto Leyva-Porras, Pedro Pizá-Ruiza, Mario Miki-Yoshidaa, Materials Research, Vol. , Pag.0-0, (2016).

[4] B.E. Monarrez-Cordero, P. Amezaga-Madrid*, L. Fuentes-Cobas, M.E. Montero-Cabrera, M. Miki-Yoshida. J. Alloys and Compounds, Vol. 718, 414-424 (2017).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Raúl HERRERA BASURTO

Subdirección de Posgrado e Investigación Universidad Aeronáutica en Querétaro. Colón, Qro., CP 76178.
Tel. (442) 111 00 66
Fax. (442) 111 00 66
E-mail: raul.herrera@unaq.edu.mx
Personal website:
https://www.researchgate.net/profile/Raul_Herrera-Basurto

It obtained PhD Fine Chemistry by the University of Cordoba, Spain. I was working for 21 years at the National Institute of Metrology of Mexico (CENAM). I have achieved research stays in different laboratories, national (CINVESTAV, IPICYT, ESIQIE-IPN) and international (NIST, IMMJ).

I am working about nanosciences, nanotechnology, metrology, standarization, education and lab on chip. Also, we make the development of the measure devices, standard and reference materials for nanotechnology and nanosciences. I like to investigate about mechanism news to teach metrology, aerospace and aeronautical science.The above as aplications for advanced materials, aerospace and aeronautical.

Publications:

[1] H.R. Guzmán-Carrillo, E.M. Rivera-Muñoz, N. Cayetano-Castro, R. Herrera-Basurto, Z. Barquera-Bibiano, F. Mercader-Trejo, A. Manzano-Ramírez, *Facile control of ZnO nanostructures by varying molar concentration of zinc acetate*, *MRB* **(16) 32538-7 (2017)**.
[2] E.S. Mañoso, R. Herrera-Basurto, B.M. Simonet, M. Valcárcel, *Sensors and Actuators* **B 186** (2013).
[3] Herrera-Basurto R., Mercader-Trejo. F. E., Rodríguez-López, A., Manzano-Ramírez, A., *The Definition of Measurement Process and its Importance in Metrology*, *RIIT*. **4**, 21 (2016).
[4] C. Carbajal, F. Mercader-Trejo, A. Rodriguez-López, R. Herrera-Basurto, *Implementación de la Norma ISO/IEC 17025 en los Laboratorios Analíticos de Rutina en México*, *Congreso Mexicano de Química, Bol. Soc. Quím. Mex,* **2013, Vol. 7, Número especial**.
[5] R. Herrera-Basurto, B. Simonet, *Nanometrology*, *Encyclopedia Analytical Chemistry*. (2013)

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Dr. Víctor Vladimir Amilcar Fernández Escamilla

Departamento de Ciencias Tecnológicas, Universidad de Guadalajara, Av. Universidad #1115, 47810, Ocotlán, Jalisco, México.
Tel. (+52) 392-9259400
E-mail: vladimir.fernandez@cuci.udg.mx

I am a research professor at the Guadalajara University in Mexico. I received the master and Ph.D. degrees in chemical engineering from the Guadalajara University, Mexico. I did several stays at the Rheology Laboratory at the Domaine Universitaire in Grenoble, France. I have experience in the field of complex fluids rheology, modeling and synthesis of smarth nanomaterials such as tailored thermoresponsive nanostructured poly(N-isopropylacrylamide) hydrogels made with nanoparticles. My current research interest is the synthesis of novel metal nanoparticles supported in a polymer matrix (nanoparticles) for the preparation of nanocomposites with high catalytic activity for the photodegradation of chemical contaminants.

[1] V.V.A. Fernandez, J. Aguilar, J.F.A. Soltero, F.J. Moscoso-Sánchez, J.C. Sánchez-Díaz, E. Hernandez, F. Bautista & J.E. Puig, *Thermoresponsive poly(N-Isopropylacrylamide) nanogels/poly(acrylamide)nanostructured hydrogels*, *J. Macromol. Sci. Pure Appl. Chem.* **53**, 152 (2016).

[2] J. Aguilar, F. Moscoso, O. Rios, I. Ceja, J.C. Sánchez, F. bautista, J.E. Puig and V.V.A. Fernández, *Swelling behavior of poly(N-isopropylacrylamide) nanogels with narrow size distribution made by semi-continuos inverse heterophase polymerization*, *J. Macromol. Sci. Pure Appl. Chem.* **51**, 412 (2014).

[3] V.V.A. Fernandez, J. Aguilar, F. Becerra, J.C. Sáncgez-Díaz, J.F.A. Soltero, P. Ortega-Gudiño, E. Hernandez, F. Bautista, J.E. Puig, *Tailoring thermoresponsive nanostructured poly(N-isopropylacrylamide) hydrogels made with poly(acrylamide) nanoparticles*, *Colloid Polym. Sci., Science* **291**, 1829 (2013).

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Program 3rd Mexico-China Workshop on NANO: materials / science / technology for Renewable Energy and Environmental Remediation

At the XXVI International Materials Research Congress (IMRC 2017)

SATURDAY, 19 Aug		
WELCOME & INAUGURATION (9:00 – 9:30) Room Uxmal I & II		
	J. Antonio Zapien	NANOMXCN: raising awareness of Mexico-China collaboration opportunities
	Claudia Gutiérrez-Wing,	Welcome by the General Chair of the XXVI International Materials Research Congress (IMRC 2017)
SESSION CHAIR: YUCHAO YANG		
9:30	**Zhu Hao**	"BILATERAL MEXICO-CHINA COLLABORATIVE POLICIES AND RENEWED SINO-MEXICAN SCIENTIFIC COLLABORATION OPPORTUNITIES THAT COULD SUPPORT INITIATIVES LIKE NANOMXCN" Zhu Hao, Director for Science and Technology of the Embassy of the Peoples Republic of China in Mexico
9:45	**Lau, Leo W. M.**	NANOPOLYGONS OF MONOLAYER-METAL-DISULFIDES
10:00	**Rosei, Federico**	THE UNESCO CHAIR IN MATERIALS AND TECHNOLOGIES FOR ENERGY CONVERSION, SAVING AND STORAGE (MATECSS)
10:15	**Yang, Bin**	INTERACTIONS OF NANOPARTICLES WITH THE ARYL HYDROCARBON RECEPTOR (AHR) PATHWAY
10:30	**Oskam, Gerko**	NANOMATERIALS FOR SOLAR ENERGY CONVERSION SYSTEMS
10:45	**Li, Yan**	CHIRALITY-SPECIFIC GROWTH OF SINGLE-WALLED CARBON NANOTUBES
11:00-11:30	**COFFEE**	
	Session continues in Room Uxmal I & II	
SESSION CHAIR: GERKO OSKAM		
11:30	**Manríquez, Juan**	USING OF BINARY MIXTURES OF PROPYLENE CARBONATE AND 3-METHOXYPROPIONITRILE FOR PREPARING THE ELECTROLYTES OF BLACK DYE-SENSITIZED SOLAR CELLS: EFFECT OF MOLAR FRACTIONS ON FILL FACTOR AND GLOBAL CONVERSION EFFICIENCY
11:45	**Teoh, Wey Yang**	DESIGN CRITERIA IN HARNESSING SOLAR ELECTRICITY FROM WASTEWATER THROUGH PHOTOCATALYTIC FUEL CELLS
12:00	**Yuchao Yang**	MEMRISTIVE DEVICES: SWITCHING DYNAMICS AND COMPUTING APPLICATIONS
12:15	**Verde Gomez, Ysmael**	DOPED CARBON NANOSTRUCTURES FOR ELECTROCHEMICAL ENERGY DEVICES
12:30	**Qiu, Xiaohui**	EXPLORING SURFACE-ASSISTED REACTIONS TOWARD FUNCTIONAL CARBON NANOSTRUCTURES
12:45	**Rodriguez Varela, Javier**	SYNTHESIS AND CHARACTERIZATION OF Sn@Pt/C CORE-SHELL NANOSTRUCTURED ANODE CATALYSTS: HIGH PERFORMANCE FOR THE ETHANOL OXIDATION REACTION
13:00	**Guo, Xuefeng**	CARBON ELECTRODE-MOLECULE JUNCTIONS: A RELIABLE PLATFORM FOR MOLECULAR ELECTRONICS
13:15	**Muhl, Stephen**	SUBMERGED PULSED HIGH-CURRENT ARC FOR THE PRODUCTION OF NANOPARTICLES
13:30	**Wang, Jin An**	SIMULTANEOUS PRODUCTION OF CARBON NANOTUBES AND HYDROGEN-RICH FUEL USING NATURAL GAS AS FEEDSTOCK
13:45	**Sanchez-Cervantes, Eduardo Maximiano**	POLYMER OXIDE INTERLAYERED TiS2 NANOSHEETS VIA ULTRASONICATION ENHANCED CHEMICAL INTERCALATION FOR MAGNESIUM RECHARGEABLE BATTERIES
14:00-16:00	**LUNCH**	

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

Saturday, Afternoon				
	SESSION 1, Room Chichen Itza I		SESSION 2, Room Chichen Itza II	
SESSION CHAIR: ZHU HAO			SESSION CHAIR: BIN YANG	
16:00	**Wei, Zhixiang**	ORGANIC NANOSTRUCTURES FOR FLEXIBLE ENERGY CONVERSION AND ENERGY STORAGE DEVICES	**Moya, Sergio Enrique**	BIOLOGICAL FATE OF ENGINEERED NANOMATERIALS: DOSE, DEGRADATION AND AGGREGATION
16:15	**Coutino-Gonzalez, Eduardo**	NANOSTRUCTURED AG-ZEOLITE COMPOSITES AS LUMINESCENCE-BASED HUMIDITY SENSORS	**Hernandez, Roberto**	HEAVY METALS REMOVAL FROM DRINKING WATER BY THE USE OF NANOFUNCTIONALIZED NON-CONVENTIONAL ADSORBENTS MATERIALS
16:30	**Sun, Xiaoming**	SUPERWETTING ELECTRODES FOR GAS-INVOLVED ELECTROCATALYSIS	**Li, Yichuan**	RESEARCH OF PROPYLENE EPOXIDATION OVER TS-1 IN APROTIC SOLVENT
16:45	**Medina Alvarez, Juan Carlos**	HYBRID ZnO/Bi2O3 FILMS WITH VISIBLE LIGHT PHOTOCATALYTIC RESPONSE	**Velumani, Subramanian**	APPLICATION OF A SEQUENTIAL TREATMENT PROCESS FOR HEAVY METAL REMOVAL IN DRINKING WATER, BASED ON PHOTOCATALYSIS AND ADSORPTION PROCESS
17:00	**Yu, Qi**	EXPERIMENTAL STUDIES OF BORON-DOPED ZINC OXIDE MATERIALS	**Martínez del Río, Ana Elisa**	TECHNOLOGICAL CHALLENGES TO REDUCE THE ENVIRONMENTAL IMPACT OF PESTICIDES IN WESTERN MEXICO
17:15	**Rodríguez Gutiérrez, Ingrid Guadalupe**	CHARGE TRANSFER DYNAMICS AT p-CuBi2O4 PHOTOCATHODES FOR PHOTOELECTROCHEMICAL WATER SPLITTING	**Lin, Zhang**	RECYCLING OF HEAVY METAL FROM NANO-SLUDGE VIA CRYSTAL GROWTH MANIPULATION
17:30	**Zhang, Jian**	A STORY OF TITANIUM-OXO NANOCLUSTERS AND POROUS MATERIALS	**Bustos, Erika**	CONSTRUCTION AND CHARACTERIZATION OF IrO2-Ta2O5 | Ti FOR ENVIRONMENTAL ELECTROCHEMICAL APPLICATIONS
17:45	**Refugio Rodriguez Vazquez**	USE OF NON-CONVENTIONAL MATERIALS FOR THE REMOVAL OF HEAVY METALS FROM WATER	**Lin, Daohui**	ENVIRONMENTAL BEHAVIOR AND TOXICITY OF NANOMATERIALS
18:00	**POSTER SESSION and COFFEE**			

	POSTER SESSION and COFFEE	
18:00	**Alberto Vega Poot**	$WO_3/BiVO_4$ MULTILAYER HETEROJUNCTIONS FOR PHOTOELECTROCHEMICAL WATER OXIDATION: STUDY OF CHARGE TRANSFER DYNAMICS USING SMALL-SIGNAL PERTURBATION TECHNIQUES.
18:00	**Alejandro Perez-Larios**	HYDROGEN PRODUCTION IMPROVED MIXED OXIDE TiO_2-ZrO_2 PHOTOCATALYST AS SEMICONDUCTOR
18:00	**Patricia Amézaga-Madrid**	SYNTHESIS AND CHARACTERIZATION OF COMPOSITE NANOPARTICLES FE/TI/AL OXIDES FOR THE REMOVAL OF HEAVY METALS FROM WATER
18:00	**Diana Aracely Vázquez-Vargas**	OXIDE SELECTIVE ABSORBER FOR PHOTOTHERMAL SOLAR COLLECTOR
18:00	**Blanca Elizabeth Monarrez Cordero**	DESIGN AND STUDY OF A PACKED ADSORPTION COLUMN USING AL-DOPED MNPS TO REMOVE ARSENIC AND FLUORINE FROM WATER FOR HUMAN CONSUMPTION
18:00	**Ingrid Rodríguez-Gutiérrez**	THE EFFECT OF Sn^{2+} DOPING ON THE CHARGE TRANSFER DYNAMICS AT HEMATITE PHOTOELECTRODES
18:00	**Dena Pourjafari**	THIRD-GENERATION SOLAR CELLS: FUNDAMENTALS AND SCALE-UP OF DYE-SENSITIZED AND PEROVSKITE SOLAR CELLS
18:00	**Javitt Linares Ibarra**	ANALYSIS OF POLYMORPHOUS SILICON THIN FILMS FOR APPLICATIONS IN SOLAR CELLS
18:00	**Francisco Iván Lizama Tzec**	SELECTIVE COATINGS FOR SOLAR-TO-THERMAL ENERGY CONVERSION
18:00	**Sujey Castellanos-Reyes**	DIRECT MICROEMULSION POLYMERIZATION AND SOL-GEL COMBINED SYNTHESIS TO PRODUCE AlO(OH)-PMMA NANOCOMPOSITE FOR PHENOL PHOTODEGRADATION
18:00	**Josué Hernández Amezcua**	PHOTOCATALYTIC DEGRADATION OF METHYLENE BLUE OVER MIXED OXIDES ZnAl AND ZnAlGa FROM LAYERED DOUBLE HYDROXIDES.
18:00	**Roberto Erasmo Galván Juárez**	CARBON NANOTUBES OR COBALT EXPOSURE RESULTS IN OXIDATIVE DAMAGE AND INFLAMMATION IN HACAT CELLS
18:00	**Raúl Herrera-Basurto**	GREEN MATERIALS FROM FOOD WASTE AND WEEDS.

2017 NANOMXCN México-China Workshop on NANO Materials / Science / Technology

SUNDAY, Morning				
	SESSION 1, Room Chichen Itza I		SESSION 2, Room Chichen Itza II	
SESSION CHAIR: RODOLFO ZANELLA			SESSION CHAIR: BIN YANG	
8:45	**Li, Hanying**	BOOST UP ELECTRON MOBILITY OF SOLUTION-GROWN ORGANIC SINGLE CRYSTALS VIA REDUCING THE AMOUNT OF POLAR SOLVENT RESIDUES	**Ma, Juan**	CARBON NANOTUBES STIMULATE IRON DISORDER, ANEMIA OF INFLAMMATION AND SYNOVIAL INFLAMMATION THROUGH INFLAMMATORY PATHWAY AS SECONDARY EFFECTS
9:00	**Tejada, Erick Medardo**	FOAM FRACTIONATION PROCESS AND EXPERIMENTAL DESIGN FOR THE RECOVERY OF SDS USED IN THE WASHINGS OF AN ARTIFICIALLY CONTAMINATED POROUS MEDIA WITH ORGANIC POLLUTANTS	**Qu, Guangbo**	INVESTIGATIONS ON BIOCOMPATIBILITY OF BLACK PHOSPHORUS
9:15	**Wang, Qiangbin**	Ag2S QUANTUM DOTS FOR ADVANCED IN VIVO IMAGING: SEEING IS BELIEVING	**Liu, Qian**	IDENTIFICATION OF THE SOURCES OF NANOPARTICLES BY NATURAL STABLE ISOTOPIC SIGNATURES
9:30	**Zhao, Yong Sheng**	ORGANIC MICRO/NANOSCALE LASERS	**Luan, Tiangang**	ITRAQ-BASED QUANTITATIVE POTEOMIC ANALYSES REVEALING TOXICITY MECHANISMS OF ZINC OXIDE NANOPARTICLES TO DAPHNIA PULEX
9:45	**Sun, Lingdong**	CORE/SHELL RARE EARTH NANOPARTICLES FOR ULTIMATE CONTROL OVER LIGHT EMITTING	**Xu, Ming**	INVESTIGATION OF GRAPHENE OXIDE-INDUCED BIOLOGICAL EFFECTS AND UNDERLYING MOLECULAR MECHANISMS
10:00	**Morales-Acevedo, Arturo**	ELECTROCATALYTIC ACTIVITY OF NiTiO3 FOR ELECTRO-OXIDATION OF METHANOL IN ALKALINE MEDIA	**Gao, Ming**	NRF-2-DRIVEN LONG NONCODING RNA ODRUL CONTRIBUTES TO MODULATING SILVER NANOPARTICLE-INDUCED EFFECTS ON ERYTHROID CELLS.
10:15			**Wan, Bin**	P2X7 RECEPTOR REGULATES THE EXOCYTOSIS OF SINGLE-WALLED CARBON NANOTUBES IN MURINE MACROPHAGES
10:30-11:00	**COFFEE**			

SUNDAY afternoon, Room Uxmal I & II		
SESSION CHAIR: XUEFENG GUO		
11:00	**Li, Jun**	OXIDATION REACTIONS ON BULK GOLD SURFACES: A HYDROPEROXYL (OOH) MECHANISM
11:15	**Garzon, Ignacio L.**	CHIRALITY IN BARE AND LIGAND-PROTECTED METAL CLUSTERS
11:30	**Vayssieres, Lionel**	ON THE DESIGN, PERFORMANCE & STABILITY OF ADVANCED MATERIALS FOR PHOTOCATALYTIC SOLAR WATER SPLITTING
11:45	**Zanella, Rodolfo**	SYNERGETIC EFFECT OF BIMETALLIC Au-Ru/TiO2 CATALYSTS FOR COMPLETE OXIDATION OF METANOL
12:00	**Yang, Qihua**	CATALYTIC REACTIONS IN NANOREACTORS WITH CONFINED ACTIVE SPECIES
12:15	**Fuentes-Cobas, Luis E.**	ADVANCES IN THE MATERIAL PROPERTIES OPEN DATABASE
12:30	**Lu, An-Hui**	DESIGNED LOW DIMENSIONAL NANOCARBONS FOR LITHIUM-SULFUR BATTERIES
12:45	**Liu, Sijin**	GENOME-WIDE DNA METHYLATION VARIATIONS UPON ENGINEERED NANOMATERIALS AND THEIR IMPLICATIONS IN NANOSAFETY ASSESSMENT
13:00	**Wang, Rongming**	PROGRESS IN NANOSCALE CHARACTERIZATION AND MANIPULATION
13:15-13:30	**NANOMXCN technical session closing remarks**	

Note: the **NSFC Session** will be held at 14:30. Full details will be provided separately.

14:30-16:30	**NSFC Session, Room Tulum H** **Prof. ZOU Liyao**, Deputy Director General, Bureau of International Cooperation **Dr. FU Xuefeng**, Program Director, Department of Chemical Sciences **Ms. DI Ming**, Division Director, Bureau of Personnel NSFC Invited Speakers TBC

Monday, 21 Aug, Room TBC	
9:00-11:00	**NANOMXCN Collaboration and next steps planning session A** All interested to collaborate, support or help in the planning/organization of NANOMXCN 2018
12:30-14:00	**NANOMXCN Collaboration and next steps planning session B** All interested to collaborate, support or help in the planning/organization of NANOMXCN 2018

BILATERAL MEXICO- CHINA COLLABORATIVE POLICIES AND RENEWED SINO- MEXICAN SCIENTIFIC COLLABORATION OPPORTUNITIES THAT COULD SUPPORT INITIATIVES LIKE NANOMXCN

Zhu Hao[1]
[1]Director for Science and Technology of the Embassy of the Peoples Republic of China in Mexico

A. The Progress of China's International Scientific and Technological Innovation Cooperation, B. Cooperation Sino- Mexican in Science and Technology Innovation, C. Potential and Opportunity for Cooperation between China and Mexico

Keywords: Cooperation, Innovation, Sino- Mexican

Presenting author's email: zhuh2016@hotmail.com

NANOPOLYGONS OF MONOLAYER-METAL-DISULFIDES

Leo W.M. Lau[1]

[1]University of Science & Technology Beijing

Nano-polygons comprising a molecular monolayer of transitional metal dichalcogenides (referred therein MS2-mNP, with M=Mo, W, or V) are emerging novel nanomaterials having versatile edge-structures, fascinating size-dependent properties, and ease in preparation. The most common nanopolygons are nanotriangles which are referred as MS2-mNT. Here, we articulate some peculiar nature of the most stable MS2-mNTs and the manipulatibility of such nature. These mNTs are edge-terminated by M atoms stabilized with one S-passivating atom per M atom. Specifically, for M=V, MS2-mNTs of all sizes are metallic with overlapping spin-polarized valence and conduction bands. For M=Mo or W, MS2-mNTs are not spin-polarized, and their properties change periodically with k (k=number of M atoms per edge of the mNT) as follows: (a) intrinsic semiconducting when k=3i+1, such as 7,10,13,16; (b) n+semiconducting but with its Fermi level slightly above the gap, when k=3i; (c) metallic with no bandgap when k=3i-1. After deducing such a model of periodic property-changes with k, we theorize them with size-dependent evolution of edge-structures. More importantly, we show such periodic changes in electronic property can be practically manipulated via atomic edge-engineering; for example, MS2-mNTs (M=Mo or W) of all k can be pinned to intrinsic semiconducting, with relevance to applications in energy and electronics, by slightly depleting the S-passivation.

Keywords: Nano-polygons, dichalcogenides, nanotriangles

Presenting author's email: leolau@ustb.edu.cn

THE UNESCO CHAIR IN MATERIALS AND TECHNOLOGIES FOR ENERGY CONVERSION, SAVING AND STORAGE (MATECSS)

Federico Rosei[1]
[1]INRS Centre for Energy, Materials and Telecommunications, 1650 Boul. Lionel Boulet, J3X 1S2 Varennes (QC) Canada

As the age of cheap oil and fossil fuels is coming to an end, humanity will face an energy crisis. Many alternative energy sources have already been identified. However, there is no optimal solution to replace fossil fuels on a short time scale with new sources that are economically viable and environmentally sustainable in the long term. History reports disastrous consequences for human societies that exploited their resources in a non sustainable way[1], and arguably this is exactly what is happening today on a global scale. Evidence for climate change is overwhelming. This public lecture aims at describing a general picture of the looming energy crisis, particularly to promote awareness[2]. We discuss possible solutions involving the use of advanced materials and nanotechnology for energy saving, storage and conversion in the framework of the UNESCO Chair MATECSS, with focus on capacity building in renewable energy technologies.

Keywords: renewable energy technologies, sustainable development, fossil fuels

References:

1. Jared Diamond, 'Collapse' Viking Penguin (2005).
2. N. Armaroli, V. Balzani. "The Future of Energy Supply: Challenges and Opportunities", Angew. Chem. Int. Ed. 46, 52 (2007).

Presenting author's email: rosei@emt.inrs.ca

INTERACTIONS OF NANOPARTICLES WITH THE ARYL HYDROCARBON RECEPTOR (AHR) PATHWAY

Yongyi Wei[1], Bin Zhao[2], Bing Yan[1]
[1]Shandong University. [2]RCEES

Nanoparticles (NPs) have unique properties that boosted their use in various fields including medicine. However, there are concerns about the safety of NPs for use in humans. The regulation of AhR-regulated drug metabolism genes is critical for the detoxification of xenobiotics, and is important in terms of human health since these genes can be carcinogens. To investigate the potential impact of NPs on the detoxification of xenobiotics such as TCDD and the potential use of NPs for delivery of anticancer drugs that act as AhR ligands, we examined their effect on AhR-regulated drug metabolism gene induction in mouse hepatoma cells (HepaWT) and luciferase reporter-engineered HepaWT cells (CBG2.8D). Gold nanoparticles (AuNPs), siliver nanoparticles (AgNPs), TiO2 nanoparticles (nTiO2), ZnO nanoparticles (nZnO), carbon nanotubes (CNTs), graphene oxide (GO), and PEG functionalized GO (PEG-GO) were examined and the effects of PEG-GO on CYP1A1 mRNA expression using a PCR array contains 84 drug metabolism genes, confirmed through qRT-PCR. At NP concentrations that showed no significant cytotoxicity, PEG-GO upregulated the expression of CYP1A1 mRNAs in HepaWT cells. In CBG2.8D cells, PEG-GO upregulated the luciferase activities. An AhR antagonist CH223191 inhibited PEG-GO mediated gene induction, suggesting that the observed induction was AhR-dependent. AuNPs, CNTs, and GO downregulated the luciferase activities in CBG2.8D cells. TCDD-induced the luciferase expression were suppressed by AuNPs, CNTs, and GO, suggesting that AuNPs, CNTs, and GO down-regulated both basal and induced luciferase activities. Mechanisms how NPs perturb the AhR pathway will be discussed.

Keywords: Nanoparticle, toxicity, cell signaling

Presenting author's email: drbingyan@yahoo.com

NANOMATERIALS FOR SOLAR ENERGY CONVERSION SYSTEMS

Gerko Oskam[1]

[1]Department of Applied Physics, CINVESTAV-IPN, Antigua Carretera a Progreso km 6, Mérida, Yucatán 97310, México.

Materials for large-scale solar energy conversion systems need to be abundant, economic, and non-toxic, which is an important aspect of current research in third generation solar cells, materials for solar water splitting, and selective coating materials solar-to-thermal energy conversion. Our group focuses on the application and characterization of new materials for the conversion of solar energy. In photovoltaics, the efforts in our group are focused on the dye-sensitized solar cell (DSC), which is based on a mesoporous, nanostructured metal oxide substrate, usually TiO_2 or ZnO. One of the most important subjects of research is on the charge transport and recombination processes and kinetics, applying small-signal modulation techniques such as electrochemical impedance spectroscopy (EIS), and intensity-modulated photocurrent and photovoltage spectroscopy (IMPS and IMVS). We also are making progress in the scale-up of the technology fabricating mini-modules of 24 cm^2, reaching an efficiency of 4.8% for the DSCs based on anatase (in active area). We have recently started working on the hybrid perovskite solar cell, and preliminary results on the incorporation of hybrid perovskite nanoparticles in metal organic frameworks will be presented. In the search for novel materials for solar water splitting, we use a materials printer (Fujifilm Dimatix) with in order to print a large variety of binary, ternary and quaternary metal oxides via a combinatorial approach. Once a promising material has been identified, we use advanced (photo)electrochemical methods in order to study the fundamental processes taking place. Recent work has shown interesting results for the p-type semiconductor $CuBi_2O_4$, and we have analyzed the hole transport and recombination properties using IMPS and EIS. In addition, we are investigating water oxidation on n-WO_3 electrodes, using the same techniques. In the project focused on the conversion of solar-to-thermal energy, we prepare selective coatings that efficiently absorb sunlight but have a low thermal emittance, thus optimizing the conversion efficiency. We use both electrodeposition and sputtering to prepare selective coatings, using cermet and multilayer stack approaches in order to tailor the optical properties of the thin films. This project aims to generate innovations in selective coatings, and although research is performed on relatively small samples (25 cm^2), we perform scale-up of deposition of promising selective coatings onto substrates of up to 2 m long. Examples for the use of nickel and cobalt black as solar absorbers in a solar, low temperature, drying system will be presented. Recent results on Al_2O_3-Mo multilayer systems will also be presented.

Keywords: Third-generation solar cells, Solar fuels, Thermosolar energy conversion

Presenting author's email: gerko.oskam@cinvestav.mx

CHIRALITY- SPECIFIC GROWTH OF SINGLE- WALLED CARBON NANOTUBES

Yan Li[1]

[1]College of Chemistry and Molecular Engineering, Peking University, Beijing, 100871

Single- walled carbon nanotubes (SWNTs) have shown great potentials in various fields attributing to their unique structure- dependent properties, therefore, the structure- controlled preparation of SWNTs is a crucial issue for their advanced applications (e.g. carbon- based nanoelectronics) and has been a great challenge for about two decades. We developed a strategy to produce SWNTs with specific chirality, i. e. using a new family of catalysts, tungsten- based intermetallic compound nanocrystals, which have high melting points and unique atomic arrangements, to regulate the chirality of the grown SWNTs. Using W_6Co_7 as catalysts, (12,6), (14, 4), AND (16,0) SWNTs were directly synthesized. Employing intermetallic compound nanocrystals with unique structure as catalysts paves a way for the ultimate chirality control in SWNT growth and thus may promote the development in SWNT applications.

Keywords: Single- Walled Carbon Nanotubes, Chirality, Catalyst

Presenting author's email: yanli@pku.edu.cn

USING OF BINARY MIXTURES OF PROPYLENE CARBONATE AND 3-METHOXYPROPIONITRILE FOR PREPARING THE ELECTROLYTES OF BLACK DYE-SENSITIZED SOLAR CELLS: EFFECT OF MOLAR FRACTIONS ON FILL FACTOR AND GLOBAL CONVERSION EFFICIENCY

Karina Herrera-Aguilar,[1] Erika Bustos,[1] Rosalba Fuentes-Ramírez,[2] Juan Manríquez[1]

[1]Centro de Investigación y Desarrollo Tecnológico en Electroquímica S.C., Parque Tecnológico Querétaro s/n, Sanfandila, 76703, Pedro Escobedo, Qro., México. [2]División de Ciencias Naturales y Exactas, Departamento de Ingeniería Química, Universidad de Guanajuato, Noria Alta s/n, 36050, Guanajuato, Gto., México.

Black dye-sensitized solar cells (DSSCs-BD) were constructed using BD-sensitized nanoparticulate TiO_2 electrodes, PtOx-based cathodes and triiodide-iodide electrolytes containing binary mixtures of propylene carbonate (PC, 2.5cP-viscosity@20°C) and 3-methoxipropionitrile (3MPN, 1.2cP-viscosity@20°C). The solvents were combined to have 3MPN molar fractions ($?_{3MPN}$) of 0, 0.25, 0.5, 0.75 and 1. Photovoltaic responses such as conversion efficiencies (?), fill factor (*ff*) and open-circuit potential (E_{OC}) were obtained as a function of $?_{3MPN}$ under AM1.5 illumination. Electric parameters associated to the photocells performance were estimated by means of (photo)electrochemical impedance spectroscopy (PEIS) for the same $?_{3MPN}$ window. The experimental data revealed that the best *ff* = 0.53 was obtained for $?_{3MPN}$=0.25, while the highest ?=5.72% was achieved when $?_{3MPN}$=0.75. The PEIS spectra demostrated that *ff* is maximized at $?_{3MPN}$=0.25 because this condition conducted to the highest electron recombination resistance (R_{ct}=195.8?), but also to the lowest combined ionic transport resistance per viscosity unit of each binary mixture (R_d +R_D=29.67?/cP). The last parameter takes place through the TiO_2 pores (R_d) and the electrolyte bulk (R_D), respectively. On the contrast, ? was maximized at $?_{3MPN}$=0.75 because this new condition allowed achieving the highest value for the ratio R_{ct}/R_{tr} (R_{tr} is the electron trapping resistance along the TiO_2 film), thus promoting the increment of the effective electron diffusion length (L_n) up to 2L (L is the TiO_2 film thickness) [1].

Keywords: black dye-sensitized solar cells, triiodide-iodide electrolytes, binary solvents

References:

[1] Karina Herrera-Aguilar, MSc Dissertation, CIDETEQ (2016).

Presenting author's email: jmanriquez@cideteq.mx

DESIGN CRITERIA IN HARNESSING SOLAR ELECTRICITY FROM WASTEWATER THROUGH PHOTOCATALYTIC FUEL CELLS

Wey Yang Teoh[1], Xincong Lv, Chenyan Hu[1]
[1]Clean Energy and Nanotechnology Laboratory, Joint Laboratory for Energy and Environmental Catalysis, School of Energy and Environment, City University of Hong Kong, Kowloon, Hong Kong S.A.R.

The photocatalytic fuel cell (PFC) technology is capable of directly generating solar electricity from the wastewater during the remediation process. To understand the effects of different wastewater contents, we first studied the influence of different types of organic substrate on the photocurrent responses. In particular, we found the direct dependence of the organics adsorption profiles and the associated mechanisms of degradation on the efficiencies of the oxide semiconductor-based PFCs. Strong adsorbates, such as carboxylic acids, generated high photocurrent enhancements. Simple and short-chained molecules are the most efficient as a result of their fast degradation kinetics. Because the open-circuit voltage of the PFCs is dependent on the Fermi level of the photoanode, this was maximized through the selection of materials used in the construction of photoanodes. The other equally important aim was to harness the wide visible light spectrum of the solar irradiation. Lastly, we show the long-term performance of the PFCs in the treatment of actual wastewater collected from different sewage treatment plants around Hong Kong.

Keywords: Photofuelcell, Wastewater, Photoelectrode

References:

1. Hu, C., Kelm, D., Schreiner, M., Wollborn, T., Madler, L., Teoh, W.Y., Designing photoelectrodes for photocatalytic fuel cells and elucidating the effects of organic substrates, ChemSusChem 8 (2015) 4005, Cover page

Presenting author's email: wyteoh@cityu.edu.hk

MEMRISTIVE DEVICES: SWITCHING DYNAMICS AND COMPUTING APPLICATIONS

Yuchao Yang[1]
[1]Key Laboratory of Microelectronic Devices and Circuits (MOE), Institute of Microelectronics, Peking University, Beijing 100871, China.

Memristors are an important class of nanoionic devices whose intriguing properties stem from formation/dissolution of localized conduction channels and have great potential in energy-efficient and intelligent computing applications. We have performed systematic transmission electron microscopy (TEM) studies on metal filaments based memristive devices, including both ex situ and in situ observations, on both vertical and planar device structures, in different material systems, and at different dimensions. The results reveal rich information about the structure, composition and chemical state of the filaments, the filament geometry and growth directions, as well as fundamental electrochemical dynamics that govern the ionic transport and filament growth processes. We have used electrostatic force microscopy to directly probe oxygen ion migration and accumulation in HfO_2 by in situ measurements of electrostatic force gradient between the probe and the sample, as systematically verified by the charge duration, oxygen gas eruption and controlled studies utilizing different electrolytes, field directions and environments. At higher voltages, oxygen–deficient nano-filaments are formed, as directly identified employing a C_S-corrected transmission electron microscope. Based on the above understandings on the switching dynamics of memristors, we experimentally demonstrated physically evolving networks in nanoscale, solid-state, multi-terminal memristive devices and heterosynaptic plasticity, an important learning rule found in biological systems, where activity of the modulatory terminal strongly affects the synaptic facilitation/depression between the pre- and post-synaptic terminals. The same heterosynaptic devices were explored for efficient implementation of NAND function in a nonvolatile manner, which may be useful for energy-efficient computing. In order to address the intrinsic device variation in memristors originating from the filamentary mechanism, we constructed a fuzzy restricted Boltzmann machine network with fuzzified weight states, and such network shows excellent tolerance to device variations, therefore paving the way for robust neuromorphic computing based on inhomogeneous and stochastic elements.

Keywords: Memristive devices, conducting filaments, neuromorphic computing

Presenting author's email: yuchaoyang@pku.edu.cn

DOPED CARBON NANOSTRUCTURES FOR ELECTROCHEMICAL ENERGY DEVICES

Y. Verde Gómez, I. Zeferino- González, E. Montiel Macías, A. M. Valenzuela- Muñiz.

TECNM / Instituto Tecnológico de Cancún, Av. Kabah Km. 3, Cancún, Q.R., México, 77500.

Carbon nanotubes, graphene and graphene oxides have been under development due to their suitable properties to be applied in electrochemical energy devices such as supercapacitors, batteries and fuel cells [1]. Recently, carbon nanostructures doped with heteroatoms have demonstrated to play an important role to improve the activity in electrocatalyst [2]. This work presents the synthesis and characterization of the carbon nanostructures doped (CND) with nitrogen, sulfur and silicon. The CND were synthesized by a modified chemical vapor deposition technique using ferrocene as catalytic agent and toluene as carbon source. Pyridine, thiophene and triphenylsilane were used to dope the carbon during the synthesis with nitrogen, sulfur and silicon, respectively. Results show that the morphologies and chemical properties were influenced by the type of heteroatom used. The electrochemical properties will be discussed during the meeting.

Keywords: Carbon Nanotube, Nanohorn, MCVD.

References:

1. J. Ma, A. Habrioux, C. Morais, A. Lewera, W. Vogel, Y. Verde- Gómez, G. Ramos- Sanchez,P. B. Balbuena and N. Alonso- Vante, ACS Catalysis, 3 (2013) 1940?1950.
2. I. Zeferino González, A. M. Valenzuela- Muñiz, G. Alonso- Nuñez, M. H. Farías and Y. Verde Gómez, ECS J. Solid State Science and Technology, (2017) 6 (6), M3135- M3139.

Presenting author's email: yverde@itcancun.edu.mx

EXPLORING SURFACE- ASSISTED REACTIONS TOWARD FUNCTIONAL CARBON NANOSTRUCTURES

Xiaohui Qiu[1]
[1]National Center for Nanoscience and Technology, China

Understanding the dehydrogenation and dehalogenation reactions of molecular entities on surface is essential for the controlled synthesis of carbon- based nanostructures. Delicately designed precursor molecules exploit the potential of selective activation of functional groups and templating effect of substrates and promise the fabrication of nanoscale building blocks with desired geometries. Here we employed a combination of scanning tunneling microscopy, atomic force microscopy, and theoretical calculation to elucidate self- assembling of halogen- containing molecules on metal surfaces. Metallo- supramolecular assemblies are constructed via coordination bonding between metal atoms and halogen ligands. The spontaneously formed molecular scaffolds are further explored to program the structure and chemical composition of hybrid carbon architecture. We reveal the hierarchic reaction pathway of a few aromatic derivatives in an effort toward realizing carbon- based nanostructures with controllable electronic, optical and magnetic properties.

Keywords: atomic force microscopy, scanning tunneling microscopy, carbon nanostrcuture

References:

1. Graphene- like nanoribbons periodically embedded with four- and eight- membered rings, Meizhuang Liu, Mengxi Liu, Limin She, Zeqi Zha, Jinliang Pan, Shichao Li, Tao Li, Yangyong He, Zeying Cai, Jiaobing Wang, Yue Zheng, Xiaohui Qiu,Dingyong Zhong, NATURE COMMUNICATIONS 8:14924, DOI: 10.1038/ncomms14924 (2017

Presenting author's email: xhqiu@nanoctr.cn

SYNTHESIS AND CHARACTERIZATION OF Sn@Pt/C CORE-SHELL NANOSTRUCTURED ANODE CATALYSTS: HIGH PERFORMANCE FOR THE ETHANOL OXIDATION REACTION

S. Dessources[1], I.L. Alonso-Lemus[2], F.J. Rodríguez-Varela[1,3]

[1] Sustentabilidad de los Recursos Naturales y Energía, Cinvestav Unidad Saltillo, Av. Industria Metalúrgica 1062, Ramos Arizpe, Coahuila, México, C.P. 25900

[2] Cátedra Conacyt, Sustentabilidad de los Recursos Naturales y Energía, Cinvestav Unidad Saltillo

[3] Programa de Nanociencias y Nanotecnología, Cinvestav Unidad Saltillo

Nanostructured Sn@Pt/C core-shell catalysts were synthesized by three methods: Poliol, Bromide Anion Exchange (BAE) and a mixed BAE-Poliol procedure. The core-shell anodes showed a higher catalytic activity for the Ethanol Oxidation Reaction (EOR) and tolerance to COads after CO-stripping measurements, compared to Pt/C catalysts. The electrochemical testing was carried out in acid media. The nanostructured Sn@Pt/C showed high electrochemical stability as well. Their application is in Direct Alcohol Fuel Cells.

Keywords: Sn@Pt/C catalysts, Nanostructured core-shell anodes, Ethanol Oxidation Reaction

Presenting author's email: javier.varela@cinvestav.edu.mx

CARBON ELECTRODE-MOLECULE JUNCTIONS: A RELIABLE PLATFORM FOR MOLECULAR ELECTRONICS

Xuefeng Guo[1]
[1]Peking University

This talk will exemplify our on-going interest and great effort in developing efficient lithographic methodologies capable of creating molecular electronic devices through the combination of top-down micro/nanofabrication with bottom-up molecular assembly. These devices use nanogapped carbon nanomaterials (such as single-walled carbon nanotubes (SWCNTs) and graphene) as point contacts formed by electron beam lithography and precise oxygen plasma etching. Through robust amide linkages, functional molecular bridges terminated with diamine moieties are covalently wired into the carboxylic acid-functionalized nanogaps to form stable carbon electrode-molecule junctions with desired functionalities. We have used these approaches to reveal the dependence of the charge transport of individual metallo-DNA duplexes on p-stacking integrity, and fabricate molecular devices capable of realizing label-free, real-time electrical detection of biological interactions at the single-event level, or switching their molecular conductance upon exposure to external stimuli, such as ion, pH and light.

Keywords: single-molecule electronics, nanoscience, single-moelcule switch

References:

1. C. Jia, X. Guo, et al., Science, 352,1443 (2016).
2. D. Xiang, X, Wang, C. Jia, T. Lee, X. Guo, Chem. Rev. 116, 4318 (2016).
3. C. Jia, B. Ma, N. Xin, X. Guo, Acc. Chem. Res. 48, 2565 (2015).
4. C. Jia, X. Guo, Chem. Soc. Rev., 42, 5642 (2013).
5. X. Guo, Adv. Mater., 25, 3397 (2013).
6. A. Feldmen, M. L. Steigerwald, X. Guo, C. Nuckolls, Acc. Chem. Res., 41, 1731 (2008).
7. X. Guo, P. Kim, C. Nuckolls, et al., Science, 311, 356 (2006).
8. Y. Cao, X. Guo, et al., Angew. Chem. Int. Ed. 51, 12228 (2012).
9. C. Jia, X. Guo, et al., Angew. Chem. Int. Ed. 52, 8666 (2013).
10. J. Wang, X. Guo, et al., Angew. Chem. Int. Ed. 53, 5038 (2014).

Presenting author's email: guoxf@pku.edu.cn

SUBMERGED PULSED HIGH- CURRENT ARC FOR THE PRODUCTION OF NANOPARTICLES

L. Rojo Blanco[1], S. Muhl[1]
[1]Instituto de Investigaciones en Materiales, Universidad Nacional Autonoma de Mexico, CDMX, México,

A submerged pulsed high- current arc was used for the controllable preparation of bi- metallic nanoparticles using Fe and Bi electrodes. The arc was produced in D.I. water and the nanoparticles were removed from the reaction chamber by the liquid flow. The nanoparticles were separated and collected depending on their characteristics. It was found that the heavy and the light nanoparticles were very similar. SEM, EDS, XRD and optical absorption studies of the different nanoparticles were carried out. We observed an average particle size between 5 and 20 nm, the formation of oxides, a low percent of bismuth in the magnetic nanoparticles and no iron in the heavy and the light nanoparticles. Larger bi- metal spheres of more than 1.0 micron diameter were observed, and these had Fe cores covered with Bi. For a range of conditions the temporal variation of the arc was studied using a high speed Phantom camera. Both direct observation and shadowgraphy using an expanded 532nm laser, were performed. The early volume and speed of the bubble explosion increased with the electrical energy applied to the electrodes, and while the volume grew linearly with time, the speed of expansion was superlinear. Finally, at longer times we observed a somewhat complicated the bubble evolution: first the bubble expanded, reached an equilibrium state, it then contracted before again expanding, and then finally it dispersed.

Keywords: Submerged arc, Nanoparticles, Shadowgraphy

Presenting author's email: muhl@unam.mx

SIMULTANEOUS PRODUCTION OF CARBON NANOTUBES AND HYDROGEN-RICH FUEL USING NATURAL GAS AS FEEDSTOCK

Jin An Wang

Laboratory of Catalysis and Materials, Superior School of Chemical Engineering and Extractive Industries, National Polytechnic Institute, Col. Zacatenco, 07738 Mexico City, Mexico

Hydrogen is a clean fuel used in fuel cell technology and many other fields. Carbon nanotubes (CNTs) have attracted tremendous interest of both scientists and engineers due to their remarkable electronic and mechanical properties and a wide spectrum of important applications. Our research aims at developing new catalytic materials for simultaneous production of multiwalled CNTs and hydrogen or hydrogen-rich fuel. In the present work, cerium doped mesostructured MCM-41 materials with large surface area and ordered pore structure system was synthesized through a surfactant-assisted method, which was used as catalyst support by impregnating with Ni nanoparticles. In the methane decomposition reaction, the Ni/Ce-MCM-41catalysts show high catalytic activity, selectivity and stability. During 22 h of reaction, hydrogen selectivity was 100% and deactivation of the catalysts was not observed. Multiwalled CNTs with graphitic structures were formed in the evaluated catalysts. Carbon nanotubes had 30–50 nm in diameters and hundred nanometers to tens micrometers in length. Most of the metallic Ni particles were located at the tip of carbon nanotubes and possessed a shape diamond. The exposed surfaces of Ni were kept clean after reaction, which explains the high catalytic stability of these catalysts. Several types of NCTs were formed and their formation mechanisms greatly depended on the reaction temperature and degree of the interaction between the metallic Ni and the support. Most of the NCTs grew through a based-growth mode. Catalytic decomposition of hydrocarbon is proven to be one of the most promising techniques to produce both CNTs and hydrogen at large-scale with low cost and abundant natural gas as carbon sources.

Keywords: Carbon nanotubes, hydrogen, natural gas

Presenting author's email: jwang@ipn.mx

POLYMER OXIDE INTERLAYERED TiS_2 NANOSHEETS VIA ULTRASONICATION ENHANCED CHEMICAL INTERCALATION FOR MAGNESIUM RECHARGEABLE BATTERIES

E.M. Sanchez-Cervantes, D.I. Garcia Gutierrez, D.F. Garcia Gutierrez, S. de la Parra-Arciniega, L.L. Garza-Tovar, Universidad Autónoma de Nuevo León, San Nicolás de los Garza N.L. México 66455

Magnesium rechargeable batteries provide a high-energy storage perspective but there are very few suitable cathode materials due to the slow motion of the highly polarizing divalent Mg ion. Alternative methods to increase performance have incompatibly with the anode or the electrolyte and/or severe decrease in the volumetric energy density. We report a general method of interlayer expansion to transform TiS_2 intercalation host into efficient Mg storage materials. TiS_2 nanosheets were prepared by lithium chemical intercalation with ultrasonic assistance within the host material. This atomic expansion is fulfilled by inserting a controlled amount of poly(propylene oxide) into TiS_2 nanosheets increasing interlayer distances. The expansion increases magnesium ion diffusivity enabling TiS_2 to approach its theoretical storage capacity as well as to achieve a high rate capability among Mg-intercalation materials. Ongoing research results will be presented.

Keywords: Rechargable batteries, Nanosheets, Ultrasonic sonochemistry

References:

1. Zeng, Z. Yin, X. Huang, H. Li, Q. He, G. Lu, F. Boey, H. Zhang "Single-Layer Semiconducting Nanosheets: High-Yield Preparation and Device Fabrication" *Angew. Chem. Int. Ed.*, 50, 11093-11097 (2011).
2. Sun, P. Bonnick, L.F. Nazar "Layered TiS_2 Positive Electrode for Mg Batteries" *ACS Energy Lett.*, 1, 297?301 (2016).
3. N. Li, J.B. Liu, B.X. Liu "First principles study of nanostructured TiS_2 electrodes for Na and Mg ion storage" *Journal of Power Sources*, 320, 322-331 (2016).
4. Liang, H. Deog Yoo Y. Li, J. Shuai, H.A. Calderon, F.C. Robles-Hernandez, L.C. Grabow, Y. Yao "Interlayer-Expanded Molybdenum Disulfide Nanocomposites for Electrochemical Magnesium Storage" *Nano Lett.,* 15, 2194?2202 (2015).
5. P. Lemmon, J.Wu, C. Oriakhi, M.M. Lerner "Preparation of Nanocomposited containing (Polyethylene oxide) and layered solids" Electrochimica Acta, 40, 2245-2249 (1995).

Presenting author's email: salome.delaparrarc@uanl.edu.mx

ORGANIC NANOSTRUCTURES FOR FLEXIBLE ENERGY CONVERSION AND ENERGY STORAGE DEVICES

Zhixiang WEI[1]
[1]National center for nanoscience and technology, China

Recently, nanostructures of conjugated polymers /small molecules were found to be particularly advantageous for energy conversion and storage, which will lead to a future application in high performance flexible devices. My talk will include two parts: (1) Large area, flexible ternary organic solar cells. Compared with binary blends, ternary systems containing two donors and one acceptor (or one donor and two acceptors) can broaden the absorption range of active layers through complementary absorption of two donors, thereby providing a potentially effective route in achieving high parameters and thus high efficiency. A novel working mechanism is proposed for ternary system, which leads to a promising application in a large area flexible organic solar cells.

(2) Ordered nanostructure for flexible energy storage devices. We introduced a facile one-step approach to prepare vertically aligned conducting nanowire arrays on various substrates. Importantly, aligned nanowire arrays exhibited high capacitance as an electrode material for supercapacitors even at very high charge-discharge current densities. Moreover, this strategy can be extended to produce flexible lithium ion batteries by using polyimide as an electrode material. This strategy is facile to produce flexible energy storage devices possessing the merits of large capacitance, high rate capability and good stability, which leads to a future application in high performance flexible devices.

Keywords: organic nanostructures, photovoltaic, energy storage

Presenting author's email: weizx@nanoctr.cn

NANOSTRUCTURED AG- ZEOLITE COMPOSITES AS LUMINESCENCE- BASED HUMIDITY SENSORS

Coutino- Gonzalez[1,2], W. Baekelant[1], M. Van der Auweraer[1], M.B.J. Roeffaers[3], J. Hofkens[1].
[1]Chem & Tech - Molecular Imaging and Photonics, KULeuven, Celestijnenlaan 200F, B- 3001 Leuven, Belgium. [2]CONACYT - Centro de Investigación y Desarrollo Tecnológico en Electroquímica, Parque Industrial Querétaro, Sanfandila s/n, Pedro Escobedo 76703, Querétaro, México. [3]Chem & Tech - Centre for Surface Chemistry and Catalysis, KULeuven, Celestijnenlaan 200F, B- 3001 Leuven, Belgium.

Silver–zeolite composites are interesting materials with unique optical properties such as high external quantum efficiencies and large Stokes shifts. The selective formation of luminescent silver clusters within zeolite scaffolds can be achieved by varying silver guest and zeolite host conditions. Nevertheless, at present, the controlled synthesis of Ag–zeolite composites with responsive optical properties remains a challenge. In this study, silver–zeolite composites displaying a dynamical emission color change with respect to their water content were synthesized using LTA zeolites containing lithium cations as counter- balancing agents. An intense blue emission was encountered in partially hydrated LTA(Li)–Ag composites, at low silver loadings, whereas a green/yellow emission was observed in their fully hydrated state. The materials synthesized in this report possess high external quantum efficiencies, up to 62%, compared to their close analogues having Na, K, and Ca as counter- balancing ions. Due to the remarkable dynamical change in emission color depending on the hydration level of LTA(Li)–Ag composites, the use of these materials as luminescence- based humidity sensors is suggested.

Keywords: novel phosphors, silver clusters, nanostructured materials.

References:

1. G. De Cremer, E. Coutino- Gonzalez, M.B.J. Roeffaers, et al, J. Am. Chem. Soc. 2009, 131, 3049.
2. G. De Cremer, E. Coutino- Gonzalez, M.B.J. Roeffaers, et al, ChemPhysChem 2010, 11, 1627.
3. E. Coutino- Gonzalez, D. Grandjean, M.B.J. Roeffaers, et al, ChemComm 2014, 50, 1350.
4. E. Coutino- Gonzalez, M.B.J. Roeffaers, B. Dieu, et al, J. Phys. Chem. C 2013, 117, 6998.
5. H. Yahiro, K. Kurohagi, G. Okada, Y. Itagaki, M. Shiotani, A. Lund, Phys. Chem. Chem. Phys. 2002, 4, 4255.
6. E. Coutino- Gonzalez, W. Baekelant, D. Grandjean, et al, J. Mater. Chem. C 2015, 3, 11857.

Presenting author's email: ecoutino@cideteq.mx

SUPERWETTING ELECTRODES FOR GAS-INVOLVED ELECTROCATALYSIS

Wenwen Xu[1], Yingjie Li[1], Zhiyi Lu[1], Xiaoming Sun[1]
[1]State Key Laboratory of Chemical Resource Engineering, Beijing University of Chemical Technology, Beijing 100029, China

Electrochemical gas-involved reactions, including gas-evolution reaction and gas-consumption reaction, are essential parts in current energy conversion processes and industries. Although the exploration of the highly active catalysts has been very mature, less attention was paid on the gas management during the gas-involved reactions. Inspired from bio-inspired materials, scientists find that bio-mimicked electrodes with superwetting property will influence the gas transportation process during the electrochemical reactions. Our group fortunately found that the interface behavior of electrode could be tuned by surface architecture construction, for example, transferring from aerophobic to superaerophobic by engineering a series of superwetting micro-/nanostructured electrodes, eg. MoS_2. Cu nanoarray and Pt pine-like films[1-4]; transferring from aerophibic to superaerophibic by poly(tetrafluoroethylene)(PTFE) modifying, eg. CoNCNT@CFP.[5] For gas-evolution reaction, constructing nanostructured superaerophobic electrodes is effective to improve the performance by enlarging the bubble contact angle and reducing the bubble adhesion force with the surface of the electrode, thus insuring smooth leaving of the gas products. As to the gas consumption reactions, the superaerophibic electrodes are able to improve the performance by providing an unblocked gas diffusion pathway and a smooth electron transport. Therefore, construction of superwetting surface (auperserophobic for gas evolution reaction and superaerophibic for gas consumption reaction) can boost the performances of the electrodes by managing the surface bubbles.

Keywords: Superwetting electrode, electrocatalysis, gas involved;

References:

1. Z. Lu, W. Zhu, X. Yu, H. Zhang, Y. Li, X. Sun, X. Wang, H. Wang, J. Wang, J. Luo, X. Lei, L. Jiang. Adv. Mater. 26(2014) 2683-2687.
2. Y. Li, H. Zhang, T. Xu, Z. Lu, X. Wu, P. Wan, X. Sun, L. Jiang. Adv. Funct. Mater. 25(2015) 1737-1744.
3. Z. Lu,M. Sun, T. Xu, Y. Li, W. Xu, Z. Chang, Y. Ding, X. Sun, L. Jiang. Adv. Mater. 27(2015) 2361-2366.
4. X. Liu, Z. Chang, L. Luo, T. Xu, X. Lei, J. Liu, X. Sun. Chem. Mater., 26(2014) 1889-1895.
5. Z. Lu, W. Xu, J. Ma, Y. Li, X. Sun, L. Jiang. Adv. Mater, 28(2016)155-7161.

Presenting author's email: sunxm@mail.buct.edu.cn

HYBRID ZnO/Bi_2O_3 FILMS WITH VISIBLE LIGHT PHOTOCATALYTIC RESPONSE

J.C. Medina[1,2], N. S. Portillo-Vélez, M. Bizarro[1], S.E. Rodil[1].
[1]Universidad Nacional Autónoma de México - Instituto de Investigaciones en Materiales, Mexico. [2]Posgrado en Ciencia e Ingenieria de Materiales, Mexico.

Metal oxide composite films (ZnO/Bi_2O_3) were synthesized combining spray pyrolysis and magnetron sputtering techniques. The results indicated that it was possible to obtain a hybrid material in thin film form, which ZnO material presented a hexagonal wurzite structure and nanoflakes morphology while Bi_2O_3 zones presented the cubic delta phase and a nanograin morphology. X-ray diffraction, profilometry, scanning electron microscopy and X-ray photoelectron spectroscopy were used to characterize the films. The photocatalytic activity for the composite films was evaluated testing the discoloration of indigo carmine dye (IC, $C_{16}H_8N_2Na_2O_8S_2$) solution (5 ppm, pH=7) under UV light and white light. The dye discoloration and the kinetic of the reaction were estimated measuring the variation of the dye absorption band as a function of the irradiation time. The photodiscoloration rate was faster using hybrid material (ZnO/Bi_2O_3) in comparison with pure materials (ZnO and Bi_2O_3) separately; this behavior was more evident under visible light conditions. On the other hand, the mineralization of IC with this composite (ZnO/Bi_2O_3) was twofold the percentage of ZnO material using visible-light. These results suggest that there is a synergistic effect between Bi_2O_3 and ZnO, which improves the absoption of visible-light respect with pure ZnO films.
Acknowledgement: The research leading to these results has received funding from the European Community Seven Framework Programme (FP7-NMP-2010-EU-MEXICO) and CONACYT under grant agreements nº 263878 and 125141, respectively. Phocscleen 318977 and UNAM-PAPIIT IN106015.

Keywords: Semiconductors, Sputtering, Degradation of organic molecules

Presenting author's email: juan_mabermon@yahoo.com.mx

Experimental Studies of Boron-Doped Zinc Oxide Materials

Qi Yu

School of Materials Science and Engineering, Shaanxi University of Technology, Hanzhong, Shaanxi 723000, China

Transparent Conductive Oxides (TCOs) are widely used in silicon solar cells to contact electrically the cell and act as a transparent window in recent years. Boron-doped zinc oxide (B-ZnO) has attracted great attention due to its potential applications in the fields of TCO and dilutes magnetic semiconductors. Previously, the electrical transport models for the electronic transport in polycrystalline B-ZnO ?lm and room-temperature ferromagnetism in B-ZnO film were studied both experimentally and theoretically. There has been a great deal of current interest in flexible semiconductor structures because of their potentials as mobile power sources for portable electronic devices. The fabrication of indium tin oxide (ITO) coated plastic substrates, such as polyethylene naphthalate and polyethylene terephthalate (PET), is therefore an important undergoing research topic.

Inasmuch as ZnO is an important environmentally friendly semiconductor material and its nanostructures are promising for improving photocatalytic activity by adjusting the morphology and ratio of surface to bulk, we performed experimental investigation of B-doped ZnO, and found that boron doping can effectively modify the morphology and electrical properties of ZnO nanostructures. To explore photocatalytic activities of B-ZnO microspheres on PET-ITO substrates, we have fabricated in this article B-ZnO microspheres on PET-ITO flexible substrate by hydrothermal method. The boron atoms are found to play an important role in the formation of ZnO microspheres. The results of first-principles calculations demonstrate that the B atoms prefer to occupy the octahedral interstice positions as the interstitial atoms, which can lead to decrease of the band gap. The B-ZnO/PET-ITO material shows significantly enhanced efficiency for photocatalytic activities with good recyclable behavior. The corresponding mechanism will be discussed.

Keywords: zinc oxide, boron-doping, photocatalysis

Presenting author's email: kukukoko2004@163.com

CHARGE TRANSFER DYNAMICS AT p-$CuBi_2O_4$ PHOTOCATHODES FOR PHOTOELECTROCHEMICAL WATER SPLITTING

Ingrid Rodríguez-Gutiérrez[a], Rodrigo García-Rodríguez[a], Alberto Vega[a], Manuel Rodríguez Pérez[b], Geonel Rodríguez-Gattorno[a], Gerko Oskam[a].

[a]*Centro de Investigación y Estudios Avanzados del IPN (CINVESTAV-Mérida). Km 6 Antigua Carretera a Progreso CP. 97130, Mérida Yuc. México.*

[b]*Facultad de Ingeniería, Universidad Autónoma de Campeche, Campus V, s/n por Av. Ing. Humberto Lanz Cárdenas y Fracc. Ecológico Ambiental Siglo XXIII, Colonia Ex Hacienda Kála. C.P.24085. San Francisco de Campeche, México.*

The development of new p-type materials for solar-driven hydrogen production via water splitting has received a lot of attention in the past 40 years. One of the requirements to generate hydrogen by this method is that the conduction band of the p-type semiconductor is located at a higher energy level (more negative potential) than the reduction potential of water. The p-type semiconductor should also possess a narrow electronic band gap to absorb as much light as possible. $CuBi_2O_4$ is an interesting p-type semiconductor oxide that has shown promising photocurrent values under visible light [6]. Its band gap is between 1.5-1.8 eV and its favorable band edge position would make it an effective photocathode in a tandem PEC device for water splitting [1-3].

One of the principal problems to improve the efficiency of the water splitting process is the slow charge transfer to the solution and the high recombination rate in the bulk and at the interface between the semiconductor and the electrolyte solution [4]. Used properly, frequency dependent measurements such as electrochemical impedance spectroscopy (EIS) and intensity-modulated photocurrent spectroscopy (IMPS) can be employed to distinguish between these photoelectrochemical processes and to determine the time constants associated with them, providing us with vital information about the limiting processes [5].

In this work, $CuBi_2O_4$ photocathodes have been prepared onto FTO glass substrates by inkjet printing, and have been characterized with X-ray diffraction, SEM, and UV-Vis measurements. The photoelectrochemical behavior of the photocathodes has been studied by EIS and IMPS. According to the SEM images, the films obtained had an average thickness of 110 nm. XRD analysis revealed that it was possible to obtain single-phase $CuBi_2O_4$ films. The maximum photocurrent was obtained at lower voltages, where IMPS and EIS measurements show a higher charge transfer efficiency.

Keywords: solar water splitting, p-type metal oxides, small-signal perturbation methods

References:

[1] T. Arai, Y. Konishi, Y. Iwasaki, H. Sugihara, K.J. Sayama, *Combinatorial Chemistry* 2007, 9, 574?581.

[2] L. Wei, C. Shifu, Z. Sujuan, Z. Wei, Z. Huaye, Y. Xiaoling, *Journal of Nanoparticle Research* 2010, *12*, 1355?1366.

[3] M. Woodhouse and B.A. Parkinson, *Chemical Society Reviews* 2009, 38, 197?210.

[4] Pu, P., Cachet, H. and Sutter, E.M.M. *Electrochimica Acta*, 2010 55(20), 5938-5946.

[5] Ponomarev, E.A. and Peter, L.M. *Journal of Electroanalytical chemistry*, 1995, 397(1- 2), 45- 52.

[6] Sean P. Berglund, Fatwa F. Abdi, Peter Bogdanoff *Chem. Mater*., 2016, 28 (12), pp 4231–4242

Presenting author's email: ingrid.rodriguez@cinvestav.mx

A STORY OF TITANIUM-OXO NANOCLUSTERS AND POROUS MATERIALS

Jian Zhang[1]
[1]State Key Laboratory of Structural Chemistry, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fujian, Fuzhou, 350002, China

In this presentation, I will show our recent works on titanium-oxo nanoclusters and metal-organic frameworks. [1-6] The titanium-oxo cluster $[Ti_{42}(m_3\text{-}O)_{60}(O\mathit{i}Pr)_{42}(OH)_{12})]^{6-}$ (TOF-1) with the first fullerene-like Ti-O shell structure is presented. The $\{Ti_{42}O_{60}\}$ core of this compound exemplifies icosahedral (I_h) symmetry as C_{60}, the highest possible symmetry for molecules.[1] Through the labile coordination sites of a robust phosphonate-stabilized titanium-oxo cluster, 14 O-donor ligands have been successfully introduced without changing the cluster core. The increasing electron-withdrawing effect of the organic species allows the gradually reduction of bandgaps of the $\{Ti_6\}$ complexes. Transition metal ions are then incorporated by the utilization of bifunctional O/N-donor ligands, organizing these $\{Ti_6\}$ clusters into polymeric structures. [2] We report a 3.6 nm Ti_{52}-oxo cluster with precise atomic structure, which presents a largest size record in the family of titanium-oxo clusters (TOCs). The crystal growth of such large Ti_{52} is based on a stepwise inter-layer assembly approach from Ti_6 sub-structures. This work not only represents a milestone in constructing large TOCs with comparable sizes as TiO_2 nanoparticles, also brings significant advances in improving photocatalytic behaviors of TOCs. [3]

Keywords: titanium-oxo nanoclusters, metal-organic frameworks, photocatalysis

References:

1. M. Gao, F. Wang, Z. Gu, D. Zhang, L. Zhang, J. Zhang, J. Am. Chem. Soc. 2016, 138, 2556-2559.
2. J. Liu, M. Gao, W. Fang, L. Zhang, J. Zhang, Angew. Chem. Int. Ed. 2016, 55, 5160.
3. W. Fang, L. Zhang, J Zhang, J. Am. Chem. Soc. 2016, 138, 7480.
4. Z. Gu, C. Zhan, J. Zhang, X. Bu, Chem. Soc. Rev. 2016, 45, 3122.
5. Z. Gu, H. Fu, T. Neumann, Z. Xu, W. Fu, W. Wenzel, L. Zhang, J. Zhang, C. Wöll, ACS Nano 2016, 10, 977.
6. H. Zhang, M. Liu, T. Wen, J. Zhang, Coord. Chem. Rev. 2016, 307, 255.

Presenting author's email: zhj@fjirsm.ac.cn

USE OF NON-CONVENTIONAL MATERIALS FOR THE REMOVAL OF HEAVY METALS FROM WATER

E. Jiménez-Castañeda[1], P. Sánchez-Villegas[2], V. Subramaniam[1] & R. Rodríguez-Vázquez[1]

[1] Center for Research and Advanced Studies of the National Polytechnic Institute (CINVESTAV-Zacatenco). [2] National Polytechnic Institute (ENCB). Postal address: Dpto. Biotecnología y Bioingeniería. Laboratorio 44. Av. Instituto Politécnico Nacional 2508, Gustavo A. Madero, San Pedro Zacatenco, 07360 Ciudad de México

Environmental issues such as oil spills, seepages, leachates from mining processes, land disposal of solid wastes, and effluents from industries have resulted in the accumulation of heavy metals in aquatic environments. The discharge of heavy metals has exposed millions of people to their harmful effects, and it is one of the biggest environmental challenges currently faced by the world. Heavy metals are persistent, bioaccumulative, and can disrupt the metabolic functions and vital organs in humans and animals [1]. Elevated concentrations of heavy metals, including Cd, As and Cr, amongst others, have been reported in diverse areas of Mexico [2-4]. Therefore, this research aims to minimise the heavy metal load, specifically chromium, from drinking water using agro-wastes and byproducts as adsorbents. Adsorption is an effective process for removing heavy metals from aqueous solutions. Conventional adsorbents include inorganic materials with high adsorption capacity, such as activated carbons (ACs), zeolites and clays [5]. Recently the search for new materials has been directed to the use of agrowastes and other byproducts [6]. In this context, the use of non-conventional and low-cost materials for the removal of heavy metals, specifically chromium is a promising technology for drinking water treatments. This project will compare the efficiency of rice husk, eggshells, and fly ash for the chromium removal from water. The work is part of the project entitled "Application of Thermosolar, Photovoltaic & Photocatalytic Energy for The Removal of Heavy Metals from Water" (Secretariat of Energy, Mexico & The Mexican Council of Science and Technology).

Keywords: water treatment, heavy metals, chromium

References:

1. Wu, Q.; Zhou, H.; Tam, N.F.Y.; Tian, Y.; Tan, Y.; Zhou, S.; Li, Q.; Chen, Y.; Leung, J.Y.S. Contamination, toxicity and speciation of heavy metals in an industrialized urban river: Implications for the dispersal of heavy metals. Marine Pollution Bulletin 2016, 104, 153-161.
2. Del Razo, L.M.; Corona, J.C.; García-Vargas, G.; Albores, A.; Cebrián, M.E. Fluoride levels in well-water from a chronic arsenicism area of northern mexico. Environmental Pollution 1993, 80, 91-94.
3. D??az-Barriga, F.; Batres, L.; Calderón, J.; Lugo, A.; Galvao, L.; Lara, I.; Rizo, P.; Arroyave, M.a.E.; McConnell, R. The el paso smelter 20 years later: Residual impact on Mexican children. Environmental Research 1997, 74, 11-16.
4. Jane Wyatt, C.; Fimbres, C.; Romo, L.; Méndez, R.O.; Grijalva, M. Incidence of heavy metal contamination in water supplies in northern mexico. Environmental Research 1998, 76, 114-119.
5. Jiménez-Castañeda, M.; Medina, D. Use of surfactant-modified zeolites and clays for the removal of heavy metals from water. Water 2017, 9, 235.
6. Demirbas, A. Heavy metal adsorption onto agro-based waste materials: A review. Journal of Hazardous Materials 2008, 157, 220-229.

Presenting author's email: marthel.jc@gmail.com

BIOLOGICAL FATE OF ENGINEERED NANOMATERIALS: DOSE, DEGRADATION AND AGGREGATION

S.E. Moya[1]
[1]CIC biomaGUNE, Paseo Miramón 182 C, 20009 San Sebastian, Spain

Tracing Engineered Nanomaterials (ENMs) in biological matrixes and moreover, determining the intracellular or organ dose of ENMs following different exposure routes pose several scientific challenges since ENMs are not easy to visualize and to quantify once in a biological matrix. The biological fate of ENMs is fundamental to comprehend the impact of ENMs on human health as a result of an accidental exposure and to predict if, for example, the ENMs are capable to specifically deliver their cargo for a medical application in case of an intended exposure. Issues such as ENMs aggregation or degradation are of particular relevance in driving the interaction of ENMs with cells and the biodistribution of the ENMs in vivo. Determining the dose of uptaken ENMs at cellular level or per organ is necessary for the development of a predictive toxicology and to find the link between in vitro and in vivo toxicological assays. Both in vivo and in vitro dose are a result of a series of translocation processes at different biological barriers and the interaction of ENMs with molecules present in biological media and will depend on ENMs characteristics and stability. Several aspects of ENMs fate *in vitro* and *in vivo* will be discussed mainly in relation with ENM quantification and ENMs stability and aggregation. Cell uptake and intracellular fate of ENMs will be presented. Protein corona formation and the aggregation behavior of gold nanoparticles (Au NPs) will be investigated by means of Fluorescence Correlation Spectroscopy (FCS) in cell culture media and in live cells. The behavior in vitro will be compared with the level of aggregation of the NPs intracellularly. Diffusion coefficients of the NPs will be measured following NP trafficking at different positions in the cell: the endoplasmatic reticulum, the endocytic vesicles, the cytosol and in intracellular vesicles. The intracellular dose for metal oxides nanoparticles will be measured with Ion Beam Microscopy. Relations between exposure dose, intracellular dose and cell viability will be established. The bio distribution, organ accumulation and fate of radiolabelled ENMs will be studied in animal models by means of Positron Emission Tomography (PET). NPs dose per organ will be evaluated. A dual radiolabelling strategy of nanoparticle core and coating will be presented using gamma emitters with non overlapping emission bands. After intravenous administration into rats, energy- discriminant Single- Photon Emission Computerised Tomography (SPECT) resolve each radioisotope independently revealing different fate in vivo for the core and coating, which will be used to evaluate NP integrity.

Keywords: biological fate, nanotoxicology, dose

Presenting author's email: smoya@cicbiomagune.es

HEAVY METALS REMOVAL FROM DRINKING WATER BY THE USE OF NANOFUNCTIONALIZED NON- CONVENTIONAL ADSORBENTS MATERIALS

R. Hernandez- Maya[1], S. Velumani[1], M. Solis- Lopez[1].
[1]Department of Electrical Engineering, Cinvestav- Zacatenco, Mexico

In this work, we design a nano- functionalized non- conventional adsorbent materials. The non- conventional materials are taking interest since last years, because it have different advantages over the conventional methods in their application for drinking water treatment in terms of heavy metals removal. Some of the advantages that all the non- conventional materials has in common, is that they are plentiful, inexpensive, and in most of the cases, locally available. The used materials for this project are red mud, fly ash, Iron wool, that due to their chemical properties, all of them are formed by metal oxides, shows a good affinity adsorption of heavy metals. The functionalization was made with Fe3O4 nanoparticles, in order to improve the adsorbent properties due to the increasing the active sites available for the adsorption of the heavy metal ions. The composite materials was tested in a simulated contaminate solution, containing different amounts of heavy metals ions, as Arsenic, Chromium and Cadmium. The characterization surface techniques used over this composite materials include SEM, with EDX analysis, TEM and XRD, before and after the exposure in the simulated experimental solution. Also, different analytical techniques was used to determine the mechanism for the heavy metals removal, as ICP- Mass spectrometry analysis, and TOC analysis.
Acknowledgement We wish to acknowledge the financial support from the project CONACyT- SENER 263043.

Keywords: Non- conventional adsorbents, nano- functionalization, heavy metals

Presenting author's email: rob_hermay@yahoo.com.mx

RESEARCH OF PROPYLENE EPOXIDATION OVER TS-1 IN APROTIC SOLVENT

Yichuan Li[1], Jigang Zhao[2], Xiang Feng[1], Yongming Chai[2], Chenguang Liu[1] and Benxian Shen[2]
[1] State Key Laboratory of Heavy Oil Processing, College of Chemical Engineering, China University of Petroleum, Qingdao, 266580, P.R. China; [2] State Key Laboratory of Chemical Engineering, East China University of Science and Technology, Shanghai, 200237, P.R. China

Propylene oxide(PO) is recognized as a high value-added chemical intermediate for manufacturing of polyurethane and polyether resins[1,2]. HPPO(hydrogen peroxide to propylene oxide) process is the direction of PO industry sustainable development[3,4]. Methonal is known as the best solvent of this reaction system while it has been proved that methonal can cause the ring opening of PO due to its protic property, which inhibits the selectivity of epoxidation. Therefore, propylene epoxidation with H_2O_2 by TS-1 catalyst has been carried out in aprotic solvent: acetonitrile, which exhibits high selectivity of PO[5].

Herein, Kinetics parameters of the epoxidation reaction in acetonitrile were measured with a non-mechanism rate equation. Then, the effects of operating conditions on H_2O_2 conversion and selectivity of PO were systematically investigated in continuous reaction. Finally, the differences between methonal and acetonitrile in reaction mechanism were explored by contrastively simulate the TS-1 adsorption energy to propene in two solvents respectively. The results above showed that acetonitrile performed 100% PO selectivity as the generating of etherification and hydrolysis byproducts can be avoided by its aprotic and alkalescent properties could effectively inhibit the ring-opening of PO. On the other hand, epoxidation activity was lower than alcohols solvents, since the TS-1 capability of capturing propylene in methonal was stronger than in acetonitrile according to the Materials Studio calculations.

Keywords: propylene epoxidation, TS-1, high selectivity

References:

[1] Jigang Zhao, Benxian Shen, Weiguo Xiao, Ce Zhang, Lei Wang. Using titanium alkoxide complex to synthesize TS-1 and their performance for propylene epoxidation[J]. Energy Sources part A: recovery, utilization, and environmental effects, 2009, 31: 108-117.
[2] Yichuan Li, Benxian Shen, Jigang Zhao. Effect of propylene glycol monomethyl ether and rust impurities on TS-1 deactivation in propylene epoxidation[J]. Catalysis Today, 2013, 212: 169-174.
[3] Yichuan Li, Benxian Shen, Weiguo Xiao, Jigang Zhao. Commercial test of kilo ton scale direct propylene epoxidation[J]. China Petroleum Processing Petrochemical Technology, 2013, 44(4): 8-12
[4] Yichuan Li, Benxian Shen, Weiguo Xiao, Jigang Zhao. Steam Consumption on Solvent Recovery Process of 1500t/a Propylene Oxide Pilot Plant-Simulation and Optimization[J]. Asian Journal of chemistry, 2013,25(16):8905-8908.
[5] Jingru Jiao, Benxian Shen, Jigang Zhao. Exploration Research on High Selectivity of Propylene Epoxidation over TS-1 Catalyst [J]. Energy Sources part A: recovery, utilization, and environmental effects, 2011, 33:1147-1154.

Presenting author's email: liyichuan@upc.edu.cn

APPLICATION OF A SEQUENTIAL TREATMENT PROCESS FOR HEAVY METAL REMOVAL IN DRINKING WATER, BASED ON PHOTOCATALYSIS AND ADSORPTION PROCESS

S. Velumani[1], R. Hernádez-Maya[1], M. Solís-López[1].
[1]Department of Electrical Engineering, Cinvestav-Zacatenco, Mexico

In this work, we design a new experimental setup for heavy metals removal in drinking water. In this coupled process, photocatalytic and adsorption process were development to remove Arsenic, Cr and Cd for drinking water. This heavy metals are common in Mexico due to different sources, as oil and mining industry, and heavy metals are present mostly in groundwater-used as source in Mexico about 75% of the drinking water supply. In recent years, photocatalytic technology has received much interest for its cleaning, no second pollution and deep oxidation-reduction ability. The photocatalytic process in this project was made it by the implementation of solar cells, and cylindrical parabolic collectors, to collect three energy sources, as photovoltaic, photoluminic, and termosolar, to be applied in a homemade photoreactor. During the photocatalytic process, we made a pre-oxidation step of As (III) to As (V). For this process, we design a $TiO_2/BiVO_4$ nanocomposite heterostructure, which was characterized by SEM, EDX, TEM and XRD techniques. In the second step, we design a nano-functionalized non-conventional adsorbent materials, in order to improve the removal efficiency by the synergistic effect of the properties of this two process. The functionalization of the non-conventional material was made with Fe3O4 nanoparticles. The characterization surface techniques used over this composite materials include SEM, with EDX analysis, and XRD, before and after the exposure in the simulated experimental solution. Also, different analytical techniques was used to determine the mechanism for the heavy metals removal, as ICP-Mass spectrometry analysis, and TOC analysis

Acknowledgement We wish to acknowledge the financial support from the project CONACyT-SENER 263043.

Keywords: Heavy metals removal, photocatalysts, adsorption

Presenting author's email: velu@cinvestav.mx

TECHNOLOGICAL CHALLENGES TO REDUCE THE ENVIRONMENTAL IMPACT OF PESTICIDES IN WESTERN MEXICO

AE Martinez[1], JC Juarez, A Hernandez[1], GA Higareda[1], JP Navarrete[1], MF Bautista[1], GM González[1], E Granados[1], E Lua[1]
[1]Nanotechnology- Universidad de La Cienega del Rstado de Michoacán de Ocampo Av Universidad 3000. Sahuayo, Michoacan, México CP 59103

The use of synthetic pesticides to manage pest problems in agriculture is being called into question with increasing awareness regarding their adverse effects on ecosystems and human health. However, the consumption of these chemicals has significantly during the past 10 years. Only in the state of Michoacán, which ranks 1st in the world in production of avocado, onions and berrys, over 100 000 tons of chemical pesticides are used every year. Based on a survey through the use of questionnaires and interviews, we investigate farmers' practices on vegetable pest management using chemical pesticides, related cost and health effects. The information collected has been integrated into a database that has been used as a reference to indicate available nanotechnology- based green strategies for pest control also for bio- remediation and for the treatment of contaminated irrigation water. A number of indicators were used to determine the priority and technological alternatives that could be used to replace common agricultural techniques. These included: type of crop and pest; type of pesticides used and pesticide handling; storage and disposal practices; incidence of pesticide poisoning; incidence of long term effect on farmer´s health; cost and safety of alternative "nano- pesticides" and water treatment.

Keywords: Pesticides, Agriculture, Nanotechnology

Presenting author's email: anaelisamtz@gmail.com

RECYCLING OF HEAVY METAL FROM NANO- SLUDGE VIA CRYSTAL GROWTH MANIPULATION

Zhang Lin[1]

[1]School of Environment and Energy, South China University of Technology

Heavy metal containing nano- sludge could be origin not only from industrial solid wastes, but also from the process when we treating heavy metal containing wastewater via using nanomaterials. The existing state of nanophases in such sludge are very complex, however, it could be grossly divided into two catalogues, 1)harmless nanophases surrounded(either via adsorption or precipitation) by harmful heavy metals, 2) the nanophases are formed by harmful heavy metal compound directly. Through applying nanocrystal growth kinetics, we have been contributing a number of innovative efforts to achieve the targets of ‘‘recyclable use’’ of heavy metals via manipulate the crystal state of nanophases. For the first kind of situation, we use interfacial agents to induce rapid crystal growth or reduce lattice defects of the nanophase. The decrease of lattice defects and specific surface area of the harmful phase could facilitate the desorption of heavy metals from the crystal surface or interlayer. For sludge containing several kinds of nanosized heavy metal compounds, we studied the interfacial agents which could realize the selective growth of specific nanophase. Through selective regulation, the goal of recovery of different heavy metal from nanowaste could be achieved.

Keywords: heavy metal, nano- sludge, recycling

Presenting author's email: zlin@scut.edu.cn

CONSTRUCTION AND CHARACTERIZATION OF IrO_2- Ta_2O_5 | Ti FOR ENVIRONMENTAL ELECTROCHEMICAL APPLICATIONS

A. Herrada[1], G. Acosta[1],F. Manríquez[1],I. Sirés[2] and E. Bustos[1]
[1]Department of Science, Centro de Investigación y Desarrollo Tecnológico en Electroquímica, S. C. Parque Tecnológico Querétaro s/n, Sanfandila, Pedro Escobedo, 76703, Querétaro, Qro. Mexico.[2]Laboratori de Ciéncia i Tecnologia Electroquímica de Materials, Departament de Química Física, Facultat de Química, Universitat de Barcelona, Martí i Franqués 1- 11, 08028, Barcelona, Spain.

Nowadays the problem of water pollution has become more relevant for three main reasons: the first one is the increment in the generation of pollutants, the second one is that has increased awareness of the risk posed to the environment and the third one has arisen by the high cost of remediation. For the previous reason, remediation technologies that help to restore contaminated areas are very important. Within remediation technologies highlights the electro- remediation due to many factors, such as its efficiency, its short operation time and a great ability to work with a wide range of contaminants. Currently there are factors that can be study and tested to improve this technology. A key factor is the coating of the electrodes employed for the treatment of contaminated waters, which plays a key role in the efficiency of the remediation process. The ability to modify electrodes provides a path of great importance to improve the performance thereof in the process of electro- remediation. This research identifies the synthesis technique as immersion, painting and electrophoresis as the best for coating the electrodes with iridium oxide and tantalum oxide for environmental electrochemical applications as the removal of hydrocarbons in wastewater and polluted soil, electrofarming of seeds and growing of plants.

Keywords: Wastewater, Polluted soil, Electrofarming

Presenting author's email: ebustos@cideteq.mx

ENVIRONMENTAL BEHAVIOR AND TOXICITY OF NANOMATERIALS

Daohui Lin[1]
[1]Department of Environmental Science, Zhejiang University

Nanomaterials are increasing produced used in various industrial fields and environmental remediations as well. However, the super reactive properties of nanomaterials make them potentially interact with environmental organisms, which attracts increasing research attentions on the environmental behavior and ecological effects of nanomaterials. This presenter has worked on environmental behavior and biological effects of engineered nanoparticles for about 10 years. His presentation will briefly introduce below main findings in his lab. Nanoparticles can accumulate on the bio-surfaces through specific and/or non-specific interactions, damage and enter into cells, and thereby present toxicity; the widely distributed dissolved organic matter (DOM) would inhibit or enhance the nanotoxicity by altering the nano-bio interfacial interactions. DOM can bind on the surfaces of hydrophobic carbon nanotubes (CNTs) mainly by ?-? and hydrophobic interactions; the adsorbed DOM would increase hydrophilicity of the CNTs and thereby enhance aqueous stabilization of CNTs together with the increased electrosteric repulsions between CNTs, and enhance the transport of CNTs through porous media and the adsorption of heavy metal ions by CNTs; this work is furthering our knowledge on the environmental behavior of nanoparticles.

Keywords: Nanoparticles, toxicity, colloidal behavior

Presenting author's email: lindaohui@zju.edu.cn

BOOST UP ELECTRON MOBILITY OF SOLUTION-GROWN ORGANIC SINGLE CRYSTALS VIA REDUCING THE AMOUNT OF POLAR SOLVENT RESIDUES

Hanying Li[1]
[1]MOE Key Laboratory of Macromolecule Synthesis and Functionalization, State Key Laboratory of Silicon Materials, Department of Polymer Science and Engineering, Zhejiang University, Hangzhou, 310027, P. R. China.

Enhancing the electron transport to match up with the hole transport developed far ahead is critical for organic electronics. As electron motion is susceptible to extrinsic factors, to seek these factors and to avoid their negative effects become the central challenge. Here, the existence of polar solvent residues in solution-grown single-crystals of TIPS-TAP is identified as a factor detrimental to electron motion. Field-effect transistors (FETs) of the crystals exhibit electron mobility boosted up by about 60% after the residues are removed. The average electron mobility reaches up to 8.0 ± 2.2 $cm^2 V^{-1} s^{-1}$ with the highest value of 13.3 $cm^2 V^{-1} s^{-1}$, significantly higher than those obtained previously for the same molecule (1.0-5.0 $cm^2 V^{-1} s^{-1}$). Furthermore, single-crystals of TIPS-pentacene, a standard p-channel material, conduct electrons in FETs as the crytals are grown from non-polar solvents. In sharp contrast, the electron transport is suppressed in those from polar solvents. Considering that solution processability is believed to be a critical advantage of organic semiconductors for which solvents have been widely used to prepare and anneal thin films and crystals, the solvent issue pointed out in this work will significantly advance the field of organic electronics through harvesting the electron behaviors.

Keywords: Organic electronics, Field-effect transistors, Single crystals

Presenting author's email: hanying_li@zju.edu.cn

"FOAM FRACTIONATION PROCESS AND EXPERIMENTAL DESIGN FOR THE RECOVERY OF SDS USED IN THE WASHINGS OF AN ARTIFICIALLY CONTAMINATED POROUS MEDIA WITH ORGANIC POLLUTANTS".

Erick M. Tejada Carbajal, Roberto Limas Ballesteros

=Environmental Chemical Engineering Laboratory, ESIQIE, Instituto Politécnico Nacional, Zacatenco, México D.F.,

In this work several factors related to the foam fractionation process batch and its effect on the possible recovery of surfactant SDS Dodecyl Sulfate - Sodium for its acronym in English- were studied, dilute solutions of this solute were passed through a porous medium artificially contaminated with a mixture of hydrocarbons of known concentrations. Fractionation column foam was constructed based on design parameters collected in literature. This column was used to develop all experiments related to foam fractionation. A factorial design of experiments considering three factors and two levels was performed. Factors considered were the air flow, the concentration of surfactant and concentration of pollutants. With this design statistical models taking as answers recovery rate and the enrichment factor were obtained. The factorial design of experiments that had as a response to recovery rate showed that the main impact factors for this response were the concentration of SDS and the airflow condition; In addition, that the conditions that obtained the best responses were at an SDS concentration of 20 times the CMC and at an air flow of 100 ml / min, the contaminant concentration condition in the porous medium showed not to have such an important impact (In this specific response) as the variables described above, although in general the interactions with the high concentration of pollutant in the porous medium (6994 mg / L of MCH) showed better performance in the response.

Keywords: Foam Fractionation, Surfactant Recovery, Experimental Design

References:

Bordoloi, N. K., & Konwar, B. K. (2009). Bacterial biosurfactant in enhancing solubility and metabolism of petroleum hydrocarbons. *Journal of Hazardous Materials*, *170*(1), 495–505. https://doi.org/10.1016/j.jhazmat.2009.04.136

Boving, T. B., & Brusseau, M. L. (2000). Solubilization and removal of residual trichloroethene from porous media: Comparison of several solubilization agents. *Journal of Contaminant Hydrology*, *42*(1), 51–67. https://doi.org/10.1016/S0169- 7722(99)00077- 7

Darton, R. C., Supino, S., & Sweeting, K. J. (2004). Development of a multistaged foam fractionation column. *Chemical Engineering and Processing: Process Intensification*, *43*(3), 477–482. https://doi.org/10.1016/S0255- 2701(03)00136- 3

Du, L., Loha, V., & Tanner, R. D. (2000). Modeling a protein foam fractionation process. *Applied Biochemistry and Biotechnology*, *84–86*, 1087–1099. https://doi.org/10.1385/ABAB:84- 86:1- 9:1087

Geosyntec Consultants. (2004). Assessing the Feasibility of DNAPL Source Zone Remediation?: Review of Saties, (May).

Gerken, B. M., Nicolai, A., Linke, D., Zorn, H., Berger, R. G., & Parlar, H. (2006). Effective enrichment and recovery of laccase C using continuous foam fractionation. *Separation and Purification Technology*, *49*(3), 291–294.

https://doi.org/10.1016/j.seppur.2005.09.015

Harper, D. O., & Lemlich, R. (1965). Bubble and Foam Fractionation Combined. *Industrial & Engineering Chemistry Process Design and Development*, *4*(1), 13–16. https://doi.org/10.1021/i260013a004

Herman, D. C., Lenhard, R. J., & Miller, R. M. (1997). Formation and removal of hydrocarbon residual in porous media: effects of bacterial biomass and biosurfactant. *Environ Sci Technol*, *31*(5), 1290–1294. https://doi.org/10.1021/es960441b

Hernández- Espriú, A., Sánchez- León, E., Martínez- Santos, P., & Torres, L. G. (2013). Remediation of a diesel- contaminated soil from a pipeline accidental spill: Enhanced biodegradation and soil washing processes using natural gums and surfactants. *Journal of Soils and Sediments*, *13*(1), 152–165. https://doi.org/10.1007/s11368- 012- 0599- 5

Howell., B. and P. D. (2002). The drainage of a foam lamella. *Journal of Fluid Mechanics*, *458*(May 2002), 379–406. https://doi.org/10.1017/S0022112002007930

Hutzler, S., Tobin, S. T., Meagher, A. J., Marguerite, A., & Weaire, D. (2013). A model system for foam fractionation. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Science*, *469*(2154). https://doi.org/10.1098/rspa.2012.0727

Iglesias, C. (1997). Mecánica del suelo, 226.

Jafvert, C. T. (1996). Surfactants/Cosolvents, (December), 45. Retrieved from https://clu- in.org/download/remed/surf_co.pdf

Jiménez de Pablo, E. (2012). Determinación Experimental de Tensión superficial del agua en cámara micro- reológica, 1–104.

Juliane Merz, D.- I., Gerhard Schembecker, D.- I., & Andrzej Górak, D.- I. (2012). A contribution to design foam fractionation processes.

Lambert, Du, Ma, Loha, B. (2003). The effect of pH on the foam fractionation of beta- glucosidase and cellulase. *Bioresource Technology*, *87*(3), 247–53. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/16915644

Lemlich, R. (1968). Adsorptive Bubble Separation Methods; Foam Fractionation and Allied Techniques. *Ind. Eng. Chem. Res* , *60*(10), 16–29. https://doi.org/10.1021/ie50706a005

Li, X., Zeng, G. M., Huang, J. H., Zhang, C., Fang, Y. Y., Qu, Y. H., … Liu, H. L. (2009). Recovery and reuse of surfactant SDS from a MEUF retentate containing Cd2+ or Zn2+ by ultrafiltration. *Journal of Membrane Science*, *337*(1–2), 92–97. https://doi.org/10.1016/j.memsci.2009.03.030

Magabri, D. and J. (1999). Bubble size distribution and coarsening of aqueous foams. *Chemical Engineering Science*, *54*(18), 4007–4022. https://doi.org/10.1016/S0009- 2509(99)00098- 6

Manilla, A., Valadéz, J., & Garnica, P. (2002). La Permeabilidad De Los Suelos En Los Problemas De Transporte De Contaminantes. Aplicación En La Infraestructura Del Transporte, (195).

Martin, P. J., Swain, M., Darton, R. C., & Rd, P. (2006). Riser Design in Foam Fractionation, (152), 657–666.

Mulligan, C. N., Yong, R. N., & Gibbs, B. F. (2001). Surfactant- enhanced remediation of contaminated soil: A review. *Engineering Geology*, *60*(1–4), 371–380. https://doi.org/10.1016/S0013- 7952(00)00117- 4

RC DARTON, S. S. and K. S. (2004). Development of a multistaged foam fractionation column. *Chemical Engineering and Processing: Process Intensification*, *43*(3), 477–482. https://doi.org/10.1016/S0255- 2701(03)00136- 3

Savanit Boonyasuwat, Sumaeth Chavadej, M. (2003). Anionic and cationic surfactant recovery from water using a multistage foam fractionator. *Chemical Engineering Journal*, *93*(3), 241–252. https://doi.org/10.1016/S1385- 8947(03)00043- 3

Schinke, C., & Germani, J. C. (2013). Recovery of extracellular lipolytic enzymes from macrophomina phaseolina by foam fractionation with air. *Enzyme Research*, *2013*. https://doi.org/10.1155/2013/897420

Sepúlveda, T. V., & Trejo, J. V. (2002). *Tecnologías de remediación para suelos contaminados*. *Jiménez Editores*. https://doi.org/10.1007/s13398- 014- 0173- 7.2

Silvia, a, María, G., & Marina, C. C. (2009). Geología y Geotecnia. *… de Suelos. Universidad Nacional de Rosario. …*. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Geolog?a+y+Geotecnia#4

Šonc, A., & Grilc, V. (2004). Batch foam fractionation of surfactants from aqueous solutions. *Acta Chimica Slovenica*, *51*(4), 687–698.

Taylor, P., Samson, D. (1996). The effect of an anionic surfactant on the mobilization and biodegradation of PAHs in a cresote- contaminated soil. *Colloid & Polymer Science*, *274*(11), 1061–1071. https://doi.org/10.1007/BF00658371

US EPA. (1995). EPA In Situ Remediation Technology Status Report?: Surfactant Enhancements, (April), 36.

Yang, Liang Wu, Li- Zhao, Wang, R. L. (2011). Enhancing foam drainage using foam fractionation column with spiral internal for separation of sodium dodecyl sulfate. *Journal of Hazardous Materials*, *192*(3), 1900–1904. https://doi.org/10.1016/j.jhazmat.2011.07.018

Presenting author's email: zaratustra11083@yahoo.com.ar

Ag_2S QUANTUM DOTS FOR ADVANCED IN VIVO IMAGING: SEEING IS BELIEVING

Qiangbin Wang[1]

[1]CAS Key Laboratory of Nano-Bio Interface, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences

Fluorescent imaging in the second near-infrared window (NIR-II, 1.0~1.4 ?m) is appealing in in vivo imaging due to minimal autofluorescence and negligible tissue scattering in this region, affording maximal penetration depth for deep tissue imaging with high feature fidelity. Herein, for the first time, we reported a new type of NIR-II QDs- Ag_2S QDs and executed a series of in vivo imaging studies by using Ag_2S QDs. The results show that, by using Ag_2S QDs, the tissue penetration length can reach 1.5 cm, and the spatial and temporal resolution of the in vivo imaging can down to 25 μm and 10 ms, respectively, which are improved several to dozens of times in comparison with those using conventional fluorescence nanoprobes in the visible and the first near-infrared window (650-900 nm), offering in situ, real-time visualization of the biological events in vivo. With the advanced NIR-II fluorescence of Ag_2S QDs, high signal to noise ratio imaging of tumor growth and angiogenesis, imaging-guided targeting drug-delivery and therapeutics, imaging-guided precision surgery of glioma, and stem cell tracking and regeneration in vivo, etc, have been achieved.

Keywords: Ag2S QDs, Near-infrared fluorescence, in vivo imaging

Presenting author's email: qbwang2008@sinano.ac.cn

ORGANIC MICRO/NANOSCALE LASERS

Yong Sheng Zhao[1]
1Institute of Chemistry, Chinese Academy of Sciences

Exploring a universal technique for the manufacture of reproducible organic material geometries in large quantities, just as photo-lithography is to the traditional silicon-based electronics and photonics, is essential for the upcoming flexible integrated photonics.[1-4] We developed a solution printing strategy for the function-directed controllable and rapid fabrication of high-quality organic microlaser arrays, which was subsequently applied as the building blocks of the panels of organic laser displays and as the elements if photonic integrated circuits.[5] The printed soft photonic systems show competitive performances with their nowadays silicon based counterparts; and moreover, they even take advantages of mild processing, flexible doping, active/responsive characteristics, etc.

Keywords: Organic Nanophotonics, nanoscale lasers, Molecular electronics

References:

1. Zhang, W.; Yao, J.; Zhao, Y. S. Chem. Res. 2016, 49, 1691-1700.
2. Zhang, C. H.; Zou, C. L.; Dong, H.; Yan. Y.; Yao, J.; Zhao, Y. S. Science Advances 2017, 3, e1700225.
3. Dong, H.; Wei, Y.; Zhang, W.; Wei, C.; Zhang, C.; Yao, J.; Zhao, Y. S. Am. Chem. Soc. 2016, 138, 1118-1121.
4. Y. J.; Lv. Y.; Zou, C. L. Zhang, W.; Yao, J.; Zhao, Y. S. J. Am. Chem. Soc. 2016, 138, 2122-2125.
5. Zhang, C.; Zou, C. L.; Zhao, Y.; Dong, C.; Wei, C.; Wang, H.; Liu, Y.; Guo, G. C.; Yao, J.; Zhao, Y. S. Science Advances 2015, 1, e1500257.

Presenting author's email: yszhao@iccas.ac.cn

CORE/SHELL RARE EARTH NANOPARTICLES FOR ULTIMATE CONTROL OVER LIGHT EMITTING

Ling- Dong Sun[1], Hao Dong[1], Yang Li[1], Qing- Song Qin[1], Chun- Hua Yan[1]
[1]Beijing National Laboratory for Molecular Sciences, State Key Laboratory of Rare Earth Materials Chemistry and Applications, College of Chemistry and Molecular Engineering, Peking University, Beijing, 100871, China

Light emission from rare earth nanocrystals, ranged from ultraviolet to visible and even the near infrared, are attractive for a broad field of photon conversion applications. Thanks to the abundant energy levels of rare earth ions, resonance energy transfer, cross relaxation and phonon related nonradiation mechanism are important for controlling over light emitting processes. Combined with nanostructure, which is able to localize the energy transfer in nanoscale domain, the transition within typical rare earth ions could be confined and even combined via various component layers. Based on this consideration, core/shell nanostructure are introduced as an ideal platform to realize selective or combinatorial light emitting from rare earth ions. Nd^{3+}®Yb^{3+} energy transfer was designed to combine with upconverting via a core/shell structure. Typically, upconversion emissions form Er^{3+} or Tm^{3+} could be sensitized both from Yb^{3+} (970 nm, $^4F_{5/2}$, ®$^4F_{7/2}$) and Nd^{3+} (808 nm, $^4I_{9/2}$®$^4F_{5/2}$) simutaneously. Furthermore, downshifting emissions from Nd^{3+} (1064 nm, $^4F_{3/2}$®$^4I_{13/2}$) and Yb^{3+} (970 nm, $^4F_{5/2}$, ®$^4F_{7/2}$) could be observed selectively or simultaneously.Together with a higher quantum efficiency, these emitting rare earth nanocrystals could be used as NIR excited and emitted nanoprobes for imaging and detection.

Keywords: rare earth, upconversion emission, NIR

References:

1. Y.F. Wang, G. Y. Liu, L. D. Sun, J. W. Xiao, J. C. Zhou, C. H. Yan, ACS Nano 7 (2013) 7200.
2. H. Dong, L. D. Sun, Y.F. Wang, J. Ke, R. Si, J. W. Xiao, G. M. Lyu, S. Shi, C. H. Yan, J. Am. Chem. Soc. 137 (2015), 6569.
3. L. Wang, H. Dong, Y. Li, R. Liu, Y.F. Wang, H. K. Bisoyi, L. D. Sun, C. H. Yan, and Q. Li, Adv. Mater. 27 (2015), 2065.

Presenting author's email: sun@pku.edu.cn

ELECTROCATALYTIC ACTIVITY OF $NiTiO_3$ FOR ELECTRO-OXIDATION OF METHANOL IN ALKALINE MEDIA

Marco A. Ruiz-Preciado[1], Aurora A. Flores-Caballero[2], Arturo Manzo-Robledo[2] and Arturo Morales-Acevedo[1]

[1]Centro de Investigación y de Estudios Avanzados del IPN, Departamento de Ingeniería Eléctrica, Ciudad de México.

[2]Laboratorio de electroquímica y corrosión. Departamento de Ingeniería Química. SEPI. Escuela Superior de Ingeniería Química e Industrias Extractivas (ESIQIE)-IPN, Ciudad de México.

The electrochemical oxidation of methanol has been extensively investigated by several groups over the world by using various techniques that establish the nature of the species adsorbed in the methanol/catalyst interfacial region. The reason for investigating this process is that methanol can be used for energy production in Alkaline Fuel Cells (AFC) based on the alcohol oxidation by selective catalysts [1]. Ni particles have already been used to improve the electro-catalytic activity of various molecules oxidation reactions. This work describes the synthesis of nanostructured nickel titanate powders ($NiTiO_3$) by the sol-gel technique [2], and the evaluation of their electro-catalytic activity for the electro-oxidation of methanol in alkaline media by the Cyclic Voltammetry (VC) technique. The catalytic capabilities of $NiTiO_3$ has been demonstrated by oxidizing methanol when an external potential is applied under dark conditions. The Ni ions present in $NiTiO_3$ have been identified as the active species for the oxidation of organic molecules to take place on the surface of Ni^{3+} [3]. During the redox processes, $NiTiO_3$ has demonstrated great stability, not undergoing corrosion after several cycles. The successful methanol electro-oxidation shown in this work opens the possibility for using $NiTiO_3$ as an anode material in Direct Alkaline Methanol Fuel Cells (DAMFC) for energy generation.

Keywords: Nickel Titanate, Electro-oxidation, Methanol

References:

[1] A. Manzo-Robledo, A. C. Boucher, E. Pastor, N. Alonso-Vante, Fuel Cells **2** (2002) 379.
[2] M. A. Ruiz-Preciado, A. Kassiba, A. Gibaud, A. Morales-Acevedo, Materials Science in Semiconductor Processing **37** (2015) 171-178.
[3] M. González Pereira, M. Dávila Jiménez, M. P. Elizalde, A. Manzo-Robledo, N. Alonso-Vante, Electrochimica Acta **49** (2004) 3917–3925.

Presenting author's email: amorales@solar.cinvestav.mx

CARBON NANOTUBES STIMULATE IRON DISORDER, ANEMIA OF INFLAMMATION AND SYNOVIAL INFLAMMATION THROUGH INFLAMMATORY PATHWAY AS SECONDARY EFFECTS

Juan Ma[1], Sijin Liu[1]
[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China

Carbon nanotubes (CNTs) have promising applications in a wide range of biomedical fields. Although numerous toxicological studies have been performed on CNTs, few studies investigated their secondary effects beyond the primary target tissues/organs. Moreover, more efforts are needed to gain definitive understanding on the adverse outcome pathway (AOP) for CNTs, and a pragmatic framework for risk assessment has not been established yet. Our study demonstrated that all multi-wall carbon nanotubes (MWCNTs), including pristine (P-MWCNTs), aminated (MWCNTs-NH_2), polyethylene glycol (MWCNTs-PEG), polyethyleneimine (MWCNTs-PEI) and carboxylated MWCNTs (MWCNTs-COOH) provoked inflammatory cytokine interleukin-6 (IL-6) production and stimulated hepcidin induction, associated with disordered iron homeostasis, irrespective of exposure routes including intratracheal (*I.T.*), intravenous (*I.V.*) and intraperitoneal (*I.P.*) administration. Long-term exposure of MWCNTs resulted in anemia of inflammation (AI) and extramedullary erythropoiesis. PEG and COOH modifications could ameliorate such adverse secondary toxicity. We also demonstrated that CNTs significantly provoked systemic pro-inflammatory responses, leading to synovial inflammation within knee joints, as evidenced by infiltration of pro-inflammatory cells in synovium and meniscus. Mechanistic studies manifested that MWCNTs-COOH stimulated pro-inflammatory effects by activating macrophages, and the secreted pro-inflammatory cytokines primed the synoviocytes and chondrocytes, resulting in enhanced production of a large array of enzymes involved in articular cartilage degeneration, including matrix metalloproteinase (MMP) members and cyclooxygenase (COX) members and increased enzymatic activity of MMPs were demonstrated. Our current study thus suggest that there are a novel secondary toxicities of CNT, namely a new AOP to understand the secondary effects of carbon nanotubes: disordered iron homeostasis and anemia of inflammation through inflammatory pathway, synovial inflammation due to the alteration of the priming state of synoviocytes and chondrocytes under CNT-induced systemic inflammatory conditions.

Keywords: Carbon nanotubes, Pro-inflammatory responses, secondary effects

References:

1. Ma J, Li R, Liu Y, Qu G, Liu J, Guo W, Song H, Li X, Liu Y, Xia T, Yan B, Liu S.(2017) Carbon nanotubes disrupt iron homeostasis and induce anemia of inflammation through inflammatory pathway as a secondary effect distant to their portal-of-entry. Small. DOI: 1002/smll.201603830
2. Ma J, Li R, Qu G, Liu H, Yan B, Xia T, Liu Y, Liu, S.(2016) Carbon nanotubes stimulate synovial inflammation by inducing systemic pro-inflammatory cytokines. Nanoscale. 8(42):18070-18086.

Presenting author's email: juanm@rcees.ac.cn

INVESTIGATIONS ON BIOCOMPATIBILITY OF BLACK PHOSPHORUS

Guangbo Qu[1]

[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, 100085, P. R. China

As a novel 2D material, black phosphorus nanosheets (BPs) display promising properties for various applications including biomedicine. Due to its unique photothermal and photochemical attributes, BPs is considered as a good candidate for various applications in nanomedicine, including cancer phototherapies, biological imaging, drug delivery, and ion/molecule sensing. The safety evaluation on this 2D material warrants evaluation. We here investigated the in vivo and in vitro toxicity of BPs. Upon intravenous injection, BPs triggered significant inflammatory responses in mice. BPs resulted in the increased collagen in bronchioles. Using macrophages cell line, we found that BPs led to cell death to macrophages. BPs exposure resulted in abnormality in lysosome damage. BPs also stimulated the generation of proinflammatory cytokines in macrophages. Therefore, the adverse effect of BPs when applied in therapeutics warrants detailed investigations in the future.

Keywords: phosphorus nanosheets, Toxicity, nanomaterials

References:

1. Wang, X. M., Jones, A. M., Seyler, K. L. et al., Highly anisotropic and robust excitons in monolayer black phosphorus. Nat. Nanotechnol. 2015, 10, 517-521.
2. Xiang, D., Han, C., Wu, J. et al., Surface transfer doping induced effective modulation on ambipolar characteristics of few-layer black phosphorus. Nat. Commun. 2015, 6, 6485.
3. Shao, J. D., Xie, H. H., Huang, H., et al., Biodegradable black phosphorus-based nanospheres for in vivo photothermal cancer therapy. Nat. Commun. 2016, 7.

Presenting author's email: gbqu@rcees.ac.cn

IDENTIFICATION OF THE SOURCES OF NANOPARTICLES BY NATURAL STABLE ISOTOPIC SIGNATURES

Qian Liu[1], Dawei Lu[1], Xuezhi Yang[1], Guibin Jiang[1]
[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China

The rapid growth in production and usage of engineered nanoparticles (ENPs) leads to the increasing environmental level of ENPs and raises great concerns about the environmental safety of ENPs. To correctly assess the environmental safety of ENPs, a prerequisite is to distinguish the ENPs from naturally occurring particles (NOPs) in the environmental media, which is however a challenging task. Here we used multi-collector inductively coupled plasma mass spectrometry (MC-ICP-MS) to measure the natural stable isotopic compositions of ENPs and NOPs. We show that ENPs and NOPs have different stable isotopic signatures. From the stable isotope fractionation effects during the environmental transformation process of nanoparticles, it is possible to infer the underlying mechanisms of the environmental transformations and the sources of nanoparticles. This technique provides a new approach to identify the sources of nanoparticles in the environment without using any additional artificial tracers (e.g., isotope-labeled materials).

Keywords: Nanoparticle, Source tracing, Stable isotope

References:

1. D. W. Lu, Q. Liu, T. Y. Zhang, Y. Cai, Y. G. Yin, G. B. Jiang, Nature Nanotechnology, 2016, 11, 682-686.

Presenting author's email: qianliu@rcees.ac.cn

ITRAQ- BASED QUANTITATIVE POTEOMIC ANALYSES REVEALING TOXICITY MECHANISMS OF ZINC OXIDE NANOPARTICLES TO DAPHNIA PULEX

Li Lin[1] , Mingzhi Xu[1], Li Lin[1] and Tiangang Luan[1]
[1]School of Life Sciences, Sun Yat- Sen University, Guangzhou, China

Zinc oxide nanoparticles (ZnO NPs) are widely used in commercial products including cosmetics, fibrous materials, sensors, rubber, etc. The widespread production and use of ZnO NPs results in their release to the environment inevitably, which raises concern about their toxicity. There are many published literatures in recent years that focused on the toxicity of ZnO NPs to aquatic organism including alga, crustaceans, zebra fish, etc. However, the toxicity mechanism of ZnO NPs is not fully understood at present. It is still controversial whether the dissolved zinc ions or the particles contribute to the toxicity of ZnO NPs.

In the present study, we found that ZnO NPs dissolved partly in reconstituted moderately hard water within 24 h, which exhibited a higher solubility compared to bulk zinc oxide. The 24 h and 48 h EC50 of ZnO NPs to freshwater crustacean Daphnia pulex were 0.40 and 0.24 mg/L respectively, indicating the high toxicity of ZnO NPs towards D. pulex. To provide further insights into the toxicity mechanism of ZnO NPs to D. pulex, an iTRAQ- based quantitative proteomic study was carried out. A total of 2,406 proteins were detected, of which 1,371 proteins were used in quantitative analysis. Exposed to ZnO NPs, bulk ZnO and zinc salt resulted in 262, 331 and 360 proteins differentially expressed in D. pulex with 224 proteins shared among the three treatments, suggesting that the three treatments had a similar toxicity mechanism and the released zinc ions might mainly contribute to the toxic effect of ZnO NPs. Bioinformatics analysis of the differentially expressed proteins revealed that it led to down regulation of chitinase expression, destruction of calcium homeostasis, enhancement of energy metabolism, an increase of reactive oxygen species (ROS), endoplasmic reticulum stress (ER stress) and a decrease of digestive enzymes secretion in all the three treatment groups. All the results demonstrated that ZnO NPs is extremely toxic to D.pulex, and the released zinc ions mainly contribute to the toxic effect of ZnO NPs.

Keywords: Zinc oxide nanoparticles, Daphnia pulex, Quatitative proteomic analyses

Presenting author's email: cesltg@mail.sysu.edu.cn

INVESTIGATION OF GRAPHENE OXIDE- INDUCED BIOLOGICAL EFFECTS AND UNDERLYING MOLECULAR MECHANISMS

Jianqiang Zhu[1], Ming Xu[1], Sijin Liu[1]
[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco- Environmental Sciences, Chinese Academy of Sciences, Beijing, China.

The novel physicochemical properties endow graphene materials (e.g. graphene oxide, GO) with beneficial potentials in diverse biomedical and environmental fields. However, the toxicity of GO hampers its application for practical purposes, and the detailed molecular bases underlying GO- induced biological effects are still elusive.

In this study, we determined the mechanism of GO induced toxicity, and our in vitro experiments revealed that pristine GO could impair cell membrane integrity and functions including regulation of membrane- and cytoskeleton- associated genes, membrane permeability, fluidity and ion channels. Further, we discovered that GO could not only compromise plasma membrane and cytoskeleton in cells at sublethal concentrations without incurring significant cell death, but also dampen a number of biological processes. Using the toxicogenomics approaches, we laid out the gene expression signature affected by GO, and further defined those genes involved in membrane and cytoskeletal impairments responding to GO. The mechanistic investigation uncovered that the interactions of GO- integrin occurred on plasma membrane and consequently activated the integrin- FAK- Rho- ROCK pathway and suppressed the expression of integrin, resulting in compromised cell membrane and cytoskeleton and subsequent cellular priming state. Based on these biological mechanisms, the co- exposure of GO and environmental pollutant (e.g. cadium) was investigated for better understanding its environmental and health risks.

Keywords: graphene oxide, biological effect, environmental and health risks

References:

1. Zhu, J.;Xu, M.; Gao, M.; Zhang, Z.; Xu, Y.; Xia T.; Liu, S. Graphene Oxide Induced Perturbation to Plasma Membrane and Cytoskeletal Meshwork Sensitize Cancer Cells to Chemotherapeutic Agents. ACS Nano 2017, 11, 2637- 2651.
2. Xu, M.;Zhu, J.; Wang, F.; Xiong, Y.; Wu, Y.; Wang, Q.; Weng, J.; Zhang, Z.; Chen, W.; Liu, S. Improved In Vitro and In Vivo Biocompatibility of Graphene Oxide through Surface Modification: Poly(Acrylic Acid)- Functionalization is Superior to PEGylation. ACS Nano 2016, 10, 3267- 3281.

Presenting author's email: mingxu@rcees.ac.cn

NRF-2-DRIVEN LONG NONCODING RNA ODRUL CONTRIBUTES TO MODULATING SILVER NANOPARTICLE-INDUCED EFFECTS ON ERYTHROID CELLS.

Ming Gao[1], BeiBei Zhao[1], Minjun Chen[1], Yum Liu[1], Ming Xu[1], Zhe Wang[1], Sijin Liu[1], Chengdong Zhang[1]
[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, China.

The biosafety and biological effects of silver nanoparticles (Ag NPs) on human health attract increasing concern. Although considerable studies have been performed to reveal the molecular mechanisms responsible for Ag NP-induced effects, the current understanding mainly focuses on oxidative stress-associated signaling pathways activated by Ag particles and/or Ag ions. However, the molecular bases underlying the activation of these stress signaling pathways have not been thoroughly elucidated yet. In the current study, we aimed to shed light on the molecular bases of Ag NP-induced effects on erythroid cells from the perspective of long noncoding RNAs. We identi?ed a long-noncoding RNA molecule,ODRUL, which was substantially enhanced in K562 erythroid cells responding to Ag NPs, coupled to accelerated cell death. Further, we uncovered oxidative stress-driven Nrf2 transcriptionally promoted ODRUL expression in K562 cells. Downstream of Nrf2-ODRUL activation by Ag NPs, ODRUL was recognized to interact with PI4Ka protein to modulate the activities of its targets AKT and JNK. As a result, the Bcl-2 level was negatively regulated by PI4K-AKT/JNK signaling under Ag NP-induced stress, leading to enhanced cell death. Together, our ?ndings unearthed that Nrf2-mediated lnc RNA ODRUL was indispensable for Ag NP-induced toxicity in erythroid cells through regulation of AKT/JNK-Bcl-2 signaling dependent on a physical interaction with PI4Ka. Thus, this study would open a new path to depict the molecular bases of Ag NP-induced effects on erythroid cells.

Keywords: Silver nanoparticles, lncRNA, ODRUL

References:

1. Gao M, Zhao B, Chen M, et al. Nrf-2-driven long noncoding RNA ODRUL contributes to modulating silver nanoparticle-induced effects on erythroid cells[J]. Biomaterials, 2017, 130: 14-27.

Presenting author's email: sjliu@rcees.ac.cn

P2X7 RECEPTOR REGULATES THE EXOCYTOSIS OF SINGLE-WALLED CARBON NANOTUBES IN MURINE MACROPHAGES

Bin Wan[1]

[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, 100085, China

Exocytosis of single-walled carbon nanotubes (SWCNT) is fundamental to the understanding of its toxicological effects and the therapy efficiency in case of medical applications, whereas the mechanism remains elusive. It is well known that CNTs once internalized by cells tend to accumulate in lysosomes, and $P2X_7R$ was shown to regulate the secretion of lysosomes. We hypothesized that the exocytosis of SWCNTs was mediated by $P2X_7R$. In this study, macrophage cells, Raw264.7, were utilized as the cell model and SWCNTs were prepared by acid oxidation and suspended in culture media. SDS-PAGE gel electrophoresis and UV-vis-NIR spectrometer were used to measure the change of SWCNTs amount in cells and supernatants during exposure. SWCNT-exposed normal and $P2X_7R$ silenced cells were compared to reveal the role of $P2X_7R$ in mediating the removal of SWCNTs from cells. Results showed that internalized SWCNTs were accumulated in lysosomes and induced transitional release of ATP into extracellular space, which further activated $P2X_7R$, leading to the influx of calcium ions, phosphorylation of PKC, ERK1/2, p38 and JNK, as well as alkalization of lysosomes. SWCNT exposure also induced microtubule reorganization that facilitates the secretion of SWCNT-containing lysosomes. Inhibiting $P2X_7R$ signaling largely diminished the exocytosis of SWCNTs from cells, resulting in significant accumulation of SWCNTs within cells. In contrast, activation of $P2X_7$ R by ATP promoted exocytosis of SWCNTs. Conclusion: The exocytosis of SWCNTs is related to the activation of $P2X_7R$, which is followed by calcium ion influx, PKC and MAPK activation, pH elevation of lysosomes and microtubules rearrangement, resulting in the exocytosis of SWCNT-containing lysosomes.

Keywords: Single-walled carbon nanotubes, Mechanism of exocytosis, P2X7 Receptor

Presenting author's email: binwan@rcees.ac.cn

OXIDATION REACTIONS ON BULK GOLD SURFACES: A HYDROPEROXYL (OOH) MECHANISM

Jun Li[1]

[1]Department of Chemistry, Tsinghua University, Beijing 100084, China

Gold is the noblest metal in the periodic table. However, nanogold catalysis has aroused significant interest in the past three decades since the pioneering work of Haruta [1]. While small nanoparticles or subnanometer-sized clusters of gold are catalytically active, Angelici and co-workers have recently found that large-sized gold particles (~ 50 nm) or even bulk gold powders (~50000 nm) also show considerable activity in a series of oxidative reactions, although the intrinsic mechanism is unknown [2].

In this talk, we will provide an explanation for the catalytic behavior of subnanometer-sized gold clusters (Au_4, Au_{10}, Au_{20}, and Au_{38}) and bulk gold surfaces towards several oxidation reactions by using density functional theory [3,4]. A critical issue to be addressed is how molecular O_2 is activated on gold clusters and bulk gold. We find that molecular O_2 can be activated via a hydroperoxyl (ŸOOH) intermediate produced by abstracting a hydrogen atom from co-adsorbed H-containing agents. With the involvement of ŸOOH and its decomposed species (ŸOŸ and ŸOH), oxidation reactions can be achieved with low activation barriers. In addition, we will also highlight the important role of water in heterogeneous catalysis [3-8].

Keywords: gold catalysis, oxygen activation, hydroperoxyl mechanism

References:

[1] Haruta, M.; Kobayashi, T.; Sano, H.; Yamada, N. *Chem. Lett.* 1987, 405-408.
[2] Angelici, R. J. *Catal. Sci. Technol.* 2013, *3*, 279-296.
[3] Chang, C.-R.; Yang, X.-F.; Long, B.; Li, J. *ACS Catal.* 2013, *3*, 1693-1699.
[4] Yang, X.-F.; Chang, C.-R.; Wang, Y.-G.; Li, J. *submitted* 2017.
[5] Chang, C.-R.; Wang, Y.-G.; Li, J. *Nano Res.* 2011, *4*, 131-142.
[6] J.-C. Liu, Y. Tang, C.-R. Chang, Y.-G. Wang, J. Li, *ACS Catal*. 2016, *6*, 2525-2535.
[7] C.-R. Chang, Z.-Q. Huang, J. Li, *WIREs Comput. Mol. Sci.* 2016, *6*, 679-693.
[8] C.-R. Chang, Y.-F. Zhao, B. Long, Z.-Q. Huang, J. Li, *Sci. China Chem.* 2016, *46*, 1-10.

Presenting author's email: junli@tsinghua.edu.cn

CHIRALITY IN BARE AND LIGAND-PROTECTED METAL CLUSTERS

Ignacio L. Garzón[1]

[1]Instituto de Física UNAM, Apartado Postal 20-364, 01000 CDMX México

Chirality is a fundamental property of many molecules, including biomolecules like most amino acids. This property has also been found at the nanoscale, as it has been shown in recent theoretical and experimental studies. In particular, bare and ligand-protected gold clusters, with size under 2 nm, display chiral behavior [1]. In this communication, it will be discussed the geometric quantification of chirality of several bare and ligand-protected chiral gold clusters, through the Hausdorff chirality measure [2]. I will also present results, based on density functional theory, on the enantiospecific adsorption of the cysteine amino acid on chiral gold clusters [3,4].

Keywords: Chirality, Enantiospecific adsorption, Index of chirality

References:

[1] R. Jin et al., Chem. Rev. 116, 10346 (2016).
[2] J. J. Pelayo et al., J. Phys. Chem. C 119, 28666 (2015).
[3] X. López-Lozano et al., Phys. Rev. Lett. 97, 233401 (2006).
[4] J. J. Pelayo et al., Eur. Phys. J. D 69, 277 (2015).

Presenting author's email: garzon@fisica.unam.mx

ON THE DESIGN, PERFORMANCE & STABILITY OF ADVANCED MATERIALS FOR PHOTOCATALYTIC SOLAR WATER SPLITTING

Lionel Vayssieres[1]
[1]International Research Center for Renewable Energy (IRCRE), School of Energy & Power Engineering, Xi'an Jiaotong University, China

The latest advances along with the overview of two decades of fundamental and applied research on low-cost metal oxide semiconductor aqueous design, electronic structure and applications for renewable energy systems[1] will be presented. It includes the design and fabrication strategies[2] as well as nanodevices fabrication for efficient low-cost solar (sea)water oxidation without sacrificial agents[3]. Visible-light active heteronanostructures based on non-toxic and earth abundant materials engineered to efficiently drive water oxidation at their interfaces will be demonstrated. Their surface chemistry[4], electrical[5], electronic structure[6], photoelectrochemical, and dimensionality/confinement effects[7] along with their efficiency have been thoroughly investigated at synchrotron radiation facilities as well as in our laboratories. The most promising structures for low cost and large scale solar water splitting will be discussed along with the atomic-scale origin of their performance and stability[8].

Keywords: electronic structure, renewable energy, heteronanostructures

References:

1. Z. Su, L.Vayssieres, ACS Energy Lett. 1, 121 (2016); Y. Tachibana et al, Nat. Photon. 6, 511 (2012); On Solar Hydrogen & Nanotechnology, Wiley, 2010
2. Vayssieres, Appl. Phys. A 89, 1 (2007); Int. J. Nanotechnol. 4, 750 (2007); Int. J. Nanotechnol. 1, 1 (2004); Angew. Chem. Int. Ed. 43, 3666 (2004); Adv. Mater. 15, 464 (2003); Chem. Mater. 13, 233 (2001)
3. K. Wei et al, Nano Res. 9, 1561 (2016); C.X. Kronawitter et al, Energy Environ. Sci. 7, 3100 (2014); ibid 4, 3889 (2011)
4. Vayssieres, J. Phys. Chem. C 113, 4733 (2009); Int. J. Nanotechnol. 2,411 (2005)
5. Engel et al, Adv. Funct. Mater. 24, 4952 (2014)
6. X. Kronawitter et al, Nano Lett. 11, 3855 (2011); Phys. Rev. B 85, 125109 (2012); J. Phys. Chem. C 116, 22780 (2012)
7. Vayssieres et al, Appl. Phys. Lett. 99, 183101 (2011); Adv. Mater. 17, 2320 (2005)
8. M.G. Kibria et al, Adv. Mater. 28, 8388 (2016); J.Z Su et al, J. Phys. Chem. Lett. (2017)

Presenting author's email: lionelv@xjtu.edu.cn

SYNERGETIC EFFECT OF BIMETALLIC Au-Ru/TiO_2 CATALYSTS FOR COMPLETE OXIDATION OF METANOL

L. A. Calzada[1], S. Collins[2], C. W. Han[3], V. Ortalan[3], R. Zanella[1]

[1] Centro de Ciencias Aplicadas y Desarrollo Tecnológico, Universidad Nacional Autónoma de México. Circuito Exterior S/N, Ciudad Universitaria, C. P. 04510 Mexico City, Mexico.

[2] Instituto de Desarrollo Tecnológico para la Industria Química (INTEC) - Universidad Nacional del Litoral and CONICET, Güemes 3450, C. P. 3000 Santa Fe, Argentina.

[3] School of Materials Engineering, Purdue University, West Lafayette, IN, USA.

Volatile organic compounds (VOCs), which are characterized by high vapor pressure and low water solubility, are precursors of ozone and photochemical smog. They are emitted from outdoor sources, such as transport and industrial processes as well as from indoor sources, such as household products. The most efficient and low-cost method for their abatement is the catalytic combustion to CO_2 and H_2O, preferentially at low temperatures.

Methanol is frequently employed as a model molecule for the total oxidation of VOCs; it has been investigated using gold catalysts supported on metal oxides because gold is known to be catalytically active in oxidation reactions when it is well dispersed on reducible metal oxides. Bimetallic Ru-Au/TiO_2 catalysts prepared by deposition-precipitation with urea method were tested in the total oxidation of methanol. Different Ru:Au atomic ratios were used (1:1 to 0.25:1). The catalytic activity results showed a synergetic effect at low temperature (RT-50 °C), mainly for the 1:1 and 0.75:1 atomic ratio [1]. HAADF-STEM and STEM-EDS characterization confirmed the interaction between Ru and Au. TPR, UV-Vis spectra, XPS and DRIFTS-CO results also confirm this interaction. FTIR spectra, recorded following the oxidation of methanol as a function of the reaction temperature, showed that formates are the main reaction intermediates in the oxidation of methanol, which are formed from RT on bimetallic Ru-Au catalysts and are oxidized at lower temperatures compared to their monometallic Ru and Au counterparts [1].

Acknowledgments: To PAPIIT105416, CONACYT-APN 1216 and CONACYT-CONICET 207090 projects.

[1] Lina A. Calzada, Sebastián Collins, C. W. Han, V. Ortalan, R. Zanella, Applied Catalysis B 207 (2017) 79-92

Keywords: methanol oxidation, gold, ruthenium

Presenting author's email: rodolfo.zanella@ccadet.unam.mx

CATALYTIC REACTIONS IN NANOREACTORS WITH CONFINED ACTIVE SPECIES

Qihua Yang[1]

[1]State key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

Porous materials, such as zeolites, mesoporous materials, MOFs and porous polymers, have been widely used in the field of catalysis. The catalytic reactions generally take place in the nanopore, the confined nanospace of porous materials. Thus, the assembly of catalytic active species in the confined nanospace has attracted much research attention. Recently, we focused on the development of methods for the assembly of different kinds of catalytic active species in the confined nanospace. The first example is that we have developed a silylation method for encapsulation of molecular catalysts [Co(Salen), Ru-BINAP, Binol-Ti, Fe(Salan), Ru-TsDPEN] in nanocages of mesoporous silicas.[1-3] Studies show that molecular catalysts confined in nanocages could move freely during the catalytic process. Thus, the asymmetric catalysis in nanopore exhibits homogeneous nature in nanoscale and could build up a bridge between homogeneous and heterogeneous catalysis. Moreover, it was found that the confined nanospace could enhance the cooperative activation effect to increase the catalytic activity of solid catalysts. This work provides a new opportunity for the design of efficient solid catalysts for the asymmetric reactions as well as many other reactions, which involve cooperative activation by separate catalytic centers or second-order kinetic dependence on the local concentration of catalysts. In addition to molecular catalysts, a novel hybrid solid acid with a double-shell nanostructurewas fabricated via the self-assembly of PS-SO_3H in the confined nanospace of silica hollow nanospheres.[4] The acid strength of PS-SO_3H can be reversibly enhanced and decreased by expansion and aggregation of PS-SO_3H within the confined nanospace, which is confirmed by ^{31}P MAS NMR, ammonia adsorption calorimetry and TEM characterizations. In a series of important acid-catalyzed reactions, such as esterification of fatty acid, Friedel-Crafts alkylation of toluene and cumene hydroperoxide cleavage, the solid catalyst exhibits much higher activity than Amberlyst®-15, and in some cases even higher than liquid acid, H_2SO_4, under similar reaction conditions.

Keywords: Catalysis, nanoreactor, molecular catalysts

References:

1. H. Yang, L. Zhang, L. Zhong, Q. H. Yang, C. Li, Angew. Chem. Int. Ed. 46 (2007) 6861.
2. S. Y. Bai, B. Li, J. Peng, X. M. Zhang, Q. H. Yang, C. Li, Chem. Sci. 3 (2012) 2846.
3. B. Li, S. Y. Bai, X. F. Wang, M. M. Zhong, Q. H. Yang, C. Li,Angew. Chem. Int. Ed. 51 (2002) 11517.
4. Xi. M. Zhang, Y. P. Zhao, S. T. Xu, Y. Yang, J. Liu, Y. X. Wei, Q. H. Yang,Nature Commun. 5 (2014) 3170.

Presenting author's email: yangqh@dicp.ac.cn

ADVANCES IN THE MATERIAL PROPERTIES OPEN DATABASE

L. E. Fuentes-Cobas[1], D. Chateigner[2], E. E. Villalobos[1], V. Barrera[1], R. Domínguez[1], A. Ledezma[1], A. Ramos[1], L. Fuentes-Montero[3], J. A. Cardona[4]

[1] Centro de Investigación en Materiales Avanzados, S.C. Chihuahua, México. [2] Normandie Université, Université de Caen Normandie, CRISMAT-CNRS, France. [3] Diamond Light Source Ltd, Software Development Team, Didcot OX11 0DE, England. [4] Universidad Nacional de Colombia, Colombia

The Material Properties Open Database (MPOD, http://mpod.cimav.edu.mx) is a functional element of the web-based *open databases* system linked with Crystallography. MPOD delivers single-crystal tensor properties in several representations, ranging from numerical matrices to 3D printing. Longitudinal moduli surfaces are expressed as symmetrized spherical harmonics expansions and displayed in computer displays as well as in smart cell phones. Properties are stored as ".mpod" files. IUCr formatting standards (CIF) are followed. The original paper containing the data is cited. Structural and experimental information is also registered and linked. The MPOD system includes a physical properties dictionary with pertinent constitutive equations according to Vol. D of the International Tables of Crystallography. "Coupling properties", e.g. piezo-effects, represent interactions linking different subsystems in a material. The implications of crystal symmetry in physical properties are systematically taken into account. The implications of crystal symmetry in physical properties are systematically taken into account. Matrices' elements and longitudinal moduli surfaces are checked for consistency with the Neumann Principle.

The representation of magnetic coupling properties, e.g. magnetoelectricity, and their link with magnetic symmetry concepts represent newly added features of MPOD. Color-symmetry and time-inversion considerations add complexity and interest to the task of systematizing the reception, validation and representation of this family of properties.

Starting with registered single-crystal properties, textured polycrystals' properties are estimated by MPOD. The user selects the crystal and property of interest, enters the considered polycrystal inverse pole figure parameters (preferred orientation direction and distribution width) and the program calculates the polycrystal effective property according to the Voigt, Reuss and Hill considerations. The symmetrized spherical harmonics treatment introduced in the characterization of single-crystal properties is extended to the calculation of textured polycrystals properties.

The MPOD presentation includes a real-time demonstration of the database possibilities. Funding from Project CONACYT 257912 is acknowledged.

Keywords: Crystal physical properties, Open database, Polycrystal effective properties

References:

1. Pepponi, S. Grazulis, D. Chateigner: *MPOD: A Material Property Open Database linked to structural information*. Nuclear Instruments and Methods in Physics Research (2012), **B284,** 10–14.
2. Fuentes-Cobas, D. Chateigner, G. Pepponi et al: *Implementing graphic outputs for the Material Properties Open Database (MPOD)*. Acta Cryst. (2014), **A70**, C1039.
3. Peter Moeck, Werner Kaminsky, Luis Fuentes-Cobas, Jean-Christophe Baloche, Daniel Chateigner: *3D printed models of materials tensor representations and the crystal morphology of alpha quartz*. Symmetry, Culture and Science (2016), **27**, 319-330.

Presenting author's email: luis.fuentes@cimav.edu.mx

DESIGNED LOW DIMENSIONAL NANOCARBONS FOR LITHIUM-SULFUR BATTERIES

An-Hui Lu[1]
[1]State Key Laboratory of Fine Chemicals, School of Chemical Engineering, Dalian University of Technology, Dalian, Liaoning, China, 116024

Lithium-sulfur (Li-S) battery is a prominent candidate for next-generation high-energy density rechargeable power systems. However, the insulating nature of sulfur and the high solubility of long-chain polysulfides give rise to low sulfur utilization, poor cycle life of the sulfur cathodes. To address these issues, we have developed conductive low dimensional nanocarbons (spherical to fibrous and to sheet-like carbons) as hosts and then immobilized sulfur into interior pore spaces aiming to keep sulfur particles electrically connected and meanwhile suppress polysulfides dissolution. For example, we designed hollow core-shell interlinked carbon spheres which consisted of a cavity, a mesoporous carbon shell, and microporous carbon core anchored to the shell locally.[1] Such anchored-cored carbon nanostructures can simultaneously serve as a guest species container with an enhanced adsorption potential and an electronically connecting matrix, which help to realize the efficient utilization of the interior space as a host for active sulfur. Subsequently, based on the concept of space grid management, we proposed a surface free energy-induced assembly approach for the synthesis of grid-like multi-cavity carbon spheres (MCC).[2] One can envisage that the interior space can be divided into many small grids interconnected with porous walls, adsorption potential in interior space can be strengthened, and the access of guest species towards the cavity spaces will be greatly facilitated. When used as a host, MCC are fully accessible for sulfur with high level in-cavity encapsulation ability of grid-like cavities and exhibit excellent cycling stability and rate performance i.e., a high capacity of 943 and 869 mA h g^{-1} after 200 cycles at a current density of 0.5 and 2.0 C, respectively. We further extend the synthesis of one dimensional nanocarbons, an ingenious design of hollow carbon nanofibers (HCF) with closed ends whose protogenetic mesopores in the shell can be retracted to micropores after sulfur infusion.[3] The characteristics of S@HCF with a high aspect ratio and thin carbon shells together facilitate the rapid transport of Li^+ ions and electrons, and a closed-end structure of carbon nanofibers further blocks the way of polysulfide dissolution from both ends. So, the S@HCF exhibits a high discharge capacity of 1638 mA h $g^{?1}$, corresponding to 98% of the theoretical capacity of sulfur. Besides, two-dimensional microporous carbons with short transport paths along the axial direction exhibit irreplaceable advantages when considering rate performances determined by transport kinetics. However, the difficulty is to incorporate sulfur into the micropores of a carbon matrix instead of just agglomerating on the external surfaces due to a high diffusion resistance. We therefore developed an electrolysis approach (ELA) that allows effective and uniform incorporation of sulfur inside the micropores of carbon nanosheets for high-performance S?C hybrid at room temperature.[4] The S-C hybrids exhibit excellent electrochemical performance, including a high initial reversible capacity, good rate capability and cycling stability (e.g., 612 mA h $g^{?1}$ at 0.5 C after 500 cycles). In summarry, we have established several strategies to design and synthesize low dimentional nanocarbon hosts toward advanced Li-S batteries.

Keywords: Nanocarbons, Electrolysis approach, Lithium?sulfur batteries

References:

1. Sun, Q., He, B., Zhang, X.- Q., Lu, A.- H., Engineering of Hollow Core- Shell Interlinked Carbon Spheres for Highly Stable Lithium- Sulfur Batteries, ACS Nano, 9, 8504- 8513.
2. Zhang, L.H., He, B., Li, W.- C., Lu, A.- H., Surface Free Energy- Induced Assembly to the Synthesis of Grid- Like Multi- Cavity Carbon Spheres with High Level In- Cavity Encapsulation for Lithium- Sulfur Cathode, Adv Energy Mater, Manuscript Number: aenm.201701518R1
3. Zhang, X.- Q., He, B., Li, W.- C., Lu, A.- H., Hollow Carbon Nanofibers with Dynamic Adjustable Pore Sizes and Closed Ends as Hosts for High- Rate Lithium- Sulfur Battery Cathodes, Nano Research, 2017, DOI: 10.1007/s12274- 017- 1737- 6.
4. He, B., Li, W.- C., Yang, C., Wang, S.Q., Lu, A.- H., Incorporating Sulfur Inside the Pores of Carbons for Advanced Lithium?Sulfur Batteries: An Electrolysis Approach, ACS Nano, 10, 1633?1639.

Presenting author's email: anhuilu@dlut.edu.cn

GENOME-WIDE DNA METHYLATION VARIATIONS UPON ENGINEERED NANOMATERIALS AND THEIR IMPLICATIONS IN NANOSAFETY ASSESSMENT

Sijin Liu[1]
[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China

Many engineered nanomaterials (ENMs) do not elicit detectable cytotoxicity using traditionally developed methods for bulk materials or chemicals, due to the low sensitivity of the methods. Thus, more sensitive methodologies are needed to evaluate their safety profiles. DNA methylation is an early sensitive parameter in response to a wide range of exogenous and endogenous stimuli including ENMs. However, there is limited understanding on this front, and, to address this issue, we performed DNA methylation sequencing at base-pair resolution in lung A549 and kidney HEK293T cells upon diverse ENM exposure. Exposure of silver nanoparticles and graphene oxide led to significant increases in global 5-mC level, which was however to a much less extent for gold nanoparticles, carbon nanotubes, nano-TiO2 and nano-ZnO. Furthermore, physicochemical properties, such surface modification, affected ENM-induced DNA methylation variations. Through gene functional mapping, significant perturbations in cellular processes and signaling pathways could be ascribed primarily to DNA methylation alterations. Supported by gene expression and toxicological/physiological evaluations, adverse outcome pathways, adaptive cell survival and compensatory effects were identified due to the genome-wide DNA methylation changes. Thus, ENM-induced DNA methylation variations represent a more sensitive fingerprint analysis of their direct and indirect effects that may be overlooked by the traditional toxicity assays, and the understanding on the structure-activity relationship for DNA methylation changes induced by ENMs would open a new avenue for their safer design.

Keywords: Adverse outcomes, DNA methylation, engineered nanomaterials

References:

1. Chen, Y., Xu, M., Zhang, J., Ma, J., Gao, M., Zhang, Z., Xu, Y., Liu, S. (2016) Genome-wide DNA methylation variations upon engineered nanomaterials and their implications in nanosafety assessment. Adv Mater. 29(6): 1604580.

Presenting author's email: sjliu@rcees.ac.cn

PROGRESS IN NANOSCALE CHARACTERIZATION AND MANIPULATION

Rongming Wang

Beijing Key Laboratory for Magneto-Photoelectrical Composite and Interface Science, School of Mathematics and Physics, University of Science and Technology Beijing, Beijing 100083, P. R. China. E-mail: rmwang@ustb.edu.cn

Nanoscale characterization has enabled the discovery of many novel functional materials which started from understanding important relationships between material properties and morphologies. Therefore, nanoscale characterization has become an important research topic in nanoscience. It fosters the foundation for the design of functional nanodevices and applications of these nanomaterials.

While nanomaterials find wider and more significant applications in almost every aspect of modern science and technology, researchers have been trying to gain detailed knowledge of novel materials with atomic (even sub-Å) scale resolution that are responsible for their unique properties, including chemical composition, atomic organization, coordinates, valence states, etc. This has been driving the development of ultramicroscopy. Here I will address the growing opportunities in this field and introduces the state-of-the-art charged-particle microscopy techniques, including conventional transmission electron microscopy, spherical-corrected microscopy and in-situ microscopy.

Keywords: characterization, Nanoscale, Manipulation

Presenting author's email: rmwang@ustb.edu.cn

$WO_3/BiVO_4$ MULTILAYER HETEROJUNCTIONS FOR PHOTOELECTROCHEMICAL WATER OXIDATION: STUDY OF CHARGE TRANSFER DYNAMICS USING SMALL-SIGNAL PERTURBATION TECHNIQUES.

Ingrid Rodríguez-Gutiérrez[a], Jinzhan Su[b], Rodrigo García-Rodríguez[a], Alberto Vega[a], Geonel Rodríguez-Gattorno[a], Lionel Vayssieres[b], Gerko Oskam[a].

[a]*Centro de Investigación y Estudios Avanzados del IPN (CINVESTAV-Mérida). Km 6 Antigua Carretera a Progreso CP. 97130, Mérida Yuc. México.*

[b]*International Research Centre for Renewable Energy, State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, Xian, Shaanxi 710049, P. R. China.*

An important challenge in science and technology consists in collecting and storing solar energy in chemical bonds in a controlled fashion, similar to how nature accomplishes photosynthesis but at higher efficiency. Photoelectrochemical (PEC) water splitting is a method that converts water into usable hydrogen (and oxygen) molecules, where hydrogen could become the clean fuel at an industrial level with water being the only combustion product. Although many semiconductor materials have been reported to be effective for PEC hydrogen production [1-2], most of them are limited in their practical use due to material photocorrosion, high charge carrier recombination, or a large band gap, i.e., low efficiency and limited stability [3].

To improve the performance of the semiconductors, the use of composite semiconductors have been shown to be an interesting pathway. One of these composites consists of the heterojunction $BiVO_4$ /WO_3 [4]: $BiVO_4$ has a band gap of 2.4 eV (monoclinic), and although it absorbs visible light reasonably efficiently, the charge carrier recombination rate is relatively high [5]. To decrease the recombination rate, $BiVO_4$ has been combined with materials such as WO_3, which possesses a good carrier mobility and the position of its conduction band is located at a lower energy in comparison with $BiVO_4$ [6].

In this work, we investigate the $WO_3/BiVO_4$ multilayer heterojunction with electrochemical impedance spectroscopy (EIS) and intensity-modulated photocurrent spectroscopy (IMPS) in order to obtain the kinetic constants governing the fundamental processes in the photoelectrochemical cell. The results will give new insight into the capabilities of this new composite material.

Keywords: Solar fuels, composite metal oxides, small-signal perturbation methods

References:

[1] F. E. Osterloh, *Chem. Soc. Rev.*, 2013, 42, 2294–2320.

[2] R. Daghrir, P. Drogui and D. Robert, *Ind. Eng. Chem. Res.*, 2013, 52, 3581–3599

[3] J. Su, L. Guo, N. Bao and C. A. Grimes, *Nano Lett.*, 2011, 11, 1928–1933.

[4] Cong Liu, Jinzhan Su and Liejin Guo, RSC Adv., 2016, 6, 27557.

[5] X. Fu, M. Xie, P. Luan and L. Jing, ACS Appl. Mater. Interfaces, 2014, 6, 18550–18557.

[6] R. Saito, Y. Miseki and K. Sayama, Chem. Commun., 2012, 48, 3833–3835

Presenting author's email: avega_3@hotmail.com

HYDROGEN PRODUCTION IMPROVED MIXED OXIDE TiO_2-ZrO_2 PHOTOCATALYST AS SEMICONDUCTOR

Alejandro Pérez-Larios[1,3], Luis Lartundo-Rojas[2], Ricardo Gómez[3]

[1]Universidad de Guadalajara, Centro Universitario de los Altos, Depto. De Ingeniería, Tepatitlán de Morelos, Jalisco, México. 47600. [2]Centro de Nanociencias y Micro y Nanotecnologías, Instituto Politécnico Nacional, Luis Enrique Erro s/n, Zacatenco, Cd. México. 07738, México, [3]Universidad Autónoma Metropolitana-Iztapalapa, Depto. de Química, Área de Catálisis, Av. San Rafael Atlixco No 189, Cd. México, México, 093403

TiO_2-ZrO_2 mixed oxide (1.0, 3.0, 5.0 and 10.0 % wt) showing large specific surface areas, small particle size and photoconductors properties were prepared by the sol-gel method and tested on the H_2 production by a water splitting reaction. The solids obtained which consist in ZrO_2 dispersed on TiO_2, these nanomaterials were characterized by XRD, nitrogen adsorption-desorption, SEM-EDS, UV-Vis and Raman spectroscopies. XRD and Raman spectra of the synthetized nanomaterials show anatase as the predominant crystalline phase. Higher specific surface area (up to 168 m^2/g) than bare TiO2 sample (64 m2/g) were obtained in all samples. The band gap energy of the solids was in the interval of 3.05-3.15 eV. The synthesized nanomaterials were tested in the photocatalytic water splitting reaction. It was observed that photoactivity was improved when ZrO_2 concentration was increased in the semiconductor. The TiO_2-ZrO_2 mixed oxide resulted up to ten times more active than the TiO_2, showing activities of 1,030 to 1,800 mmol/h vs 190 mmol/h for TiO_2.

Keywords: Hydrogen production, Mixed Oxide, Solar Light

References:

1. De Boer J. H., van den Heuvel A., Linsen B. G., *J. Catal*. **3** (1964) 268
2. Bosch G. P., Domínguez J. M., Zénith J., Rouffignac E., Guzmán O.,Tejeda J., "Técnicas Experimentales en la Caracterización de Catalizadores", Series Científicas IMP, México (1986).
3. C.Wu, X. Zhao, Y. Ren, Y. Yue,W. Hua, Y. Cao, Y. Tang, Z. Gao, J. Mol. Catal. A. 229 (2005) 233–239

Presenting author's email: alarios@cualtos.udg.mx

SYNTHESIS AND CHARACTERIZATION OF COMPOSITE NANOPARTICLES FE/TI/AL OXIDES FOR THE REMOVAL OF HEAVY METALS FROM WATER

K. Olivares-García[1], B. E. Monárrez-Cordero[2], W. Antúnez-Flores[2], C. Ornelas-Gutiérrez[2], P. Pizá-Ruiz[2], M. Miki-Yoshida[2], P. Amézaga-Madrid[2].
[1]Universidad Tecnológica de Tulancingo. [2]Centro de Investigación en Materiales Avanzados, S.C.

Heavy metals, metalloids and fluorine are a serious environmental problem because of their toxicity and their physiological repercussions in both humans and animals. These contaminants are normally in the nature and have also reached groundwater due to industrial discharges due to anthropogenic activities, which has caused a public health problem, therefore it is necessary to remove them, a viable alternative is the use of nanotechnology, to develop nanomaterials that have the property to simultaneously adsorb the heavy metals, and in addition it is a purification treatment of low cost. Here, we report the synthesis and characterization of composite nanoparticles of Fe/Al/Ti oxides by aerosol assisted chemical vapor deposition [1-2]. The microstructure of the composite nanoparticles was characterized by grazing incidence X-ray diffraction. Surface morphology and microstructure were studied by field emission scanning electron, scanning probe microscopy and transmission electron microscopy. Surface area determination was measure with BET method. Removal tests were realized at three times of exposition composite nanoparticles with different combinations of heavy metals to determine percentage of removal efficiency. The adsorption efficiency was determined from Batch experiments. After the contact time was elapsed, solutions were centrifuged for separating the composite nanoparticles from the liquid for further analysis of the remaining ions concentration by ICP technique. The collected composite nanoparticles were analyzed by high resolution transmission electron microscopy for observing the presence of all ions adsorbed on the surface.

Keywords: AACVD, composite nanoparticles, adsorption

References:

1. B.E. Monárrez-Cordero et al. Journal of Alloys and Compounds, 615 (2014) S328–S334.
2. P.G. Hernández-Salcedo et al. Journal of Alloys and Compounds, 643 (2015) S287-S296.

Presenting author's email: patricia.amezaga@cimav.edu.mx

OXIDE SELECTIVE ABSORBER FOR PHOTOTHERMAL SOLAR COLLECTOR.

D.A. Vázquez- Vargas[1],L.E. Jáuregui- Martínez[1] ,P. Amézaga- Madrid[1], R. Dorantes- Rodríguez[2], B. Cruz- Muñoz[3], W. Antúnez- Flores[1], P. Pizá- Ruiz[1], M. Miki- Yoshida[1]

The energy crisis is upon us, if the adoption of renewable energies continues in the same tendency as today, it is expected that by 2035 we will not be able to fulfill the energy demand [1]. Nowadays, almost every country has become aware of this, but the adoption trend has to increase, to achieve this more affordable and efficient energies have to become a priority. A viable alternative is solar energy. The solar radiance can be absorbed and converted to thermal or electrical energy. For thermal application, a nanomaterial with high absorptivity and low emissivity has to be generated; nanotechnology allows manipulation of materials at an atomic level and develop the foregoing properties. Metallic oxides such as copper and cobalt can be good candidates for this application [2- 3]. We report in this work the synthesis by aerosol assisted chemical vapor deposition [4] and microstructural characterization of thin films of cobalt and copper oxides deposited on borosilicate glass, copper and aluminum substrates. The precursor solutions were $Co(C_2H_3O_2)_2{\cdot}4\ H_2O$ and $Cu(CH_3COO)_2$ dissolved in methanol (0.1M). The copper substrates received a thermal treatment to increase the compatibility with the thin films. Deposition temperature was varied between 623- 773 K and gas carrier flux was varied between 5- 10 L min^{-1}. In addition, the samples were characterized by X- Ray Diffraction. Surface morphology and microstructure were studied by field emission scanning electron microscopy, and high resolution transmission electron microscopy. Optical properties were determined by measurements of total, diffuse and specular components of the reflectance and transmittance. Afterwards, various methods commonly found in the literature were used to compute the absorption coefficient of the thin films. Subsequently, the Tauc method and variations of the Kubelka- Munk method were employed to estimate the band gap of each sample.

Keywords: CuO thin films, Co2O3 thin films, AACVD

References:

[1] BP Global. (2016, June 1). BP Statistical Review of World Energy June 2016. Retrieved March 15, 2017, from https://www.bp.com/content/dam/bp/pdf/energy- economics/statistical- review- 2016/bp- statistical- review- of- world- energy- 2016 - full- report.pdf

[2] Kamble, S. et al., Journal of Alloys and Compounds, 656 (2016) 590- 597.

[3] Kumar, S. K. et al., Solar Energy, 94, (2013) 299- 304.

[4] P. Amézaga- Madrid et al. Journal of Alloys and Compounds, 509S (2011) S490- S495.

Presenting author's email: diana_vazquez11@hotmail.com

DESIGN AND STUDY OF A PACKED ADSORPTION COLUMN USING AL- DOPED MNPS TO REMOVE ARSENIC AND FLUORINE FROM WATER FOR HUMAN CONSUMPTION

B.E. Monárrez- Cordero[1], E. Flores- Tavizón[2], R. Mendoza- Anchondo[1], C. Ornelas- Gutiérrez[1], W. Antúnez- Flores[1], P.Pizá- Ruiz, M. Miki- Yoshida[1], P. Amézaga- Madrid[1]

The simultaneous removal of coexisting contaminants in nature such as As and F is a challenge, due to the lack of efficient adsorbent materials and the ionic competition of the elements by the adsorption active sites [1]. Among the various existing technologies for the removal of As and F, adsorption is considered the most appropriate due to its high efficiency, profitability and easy operation [2]. Alumina is an adsorbent widely used for the removal of fluorine; [3] while iron oxides are used to remove arsenic from water [4]. Knowing this background, an Al- doped magnetite (Al- doped MNPs) nanomaterial was synthesized by aerosol assisted chemical vapor deposition [5], which was previously tested via Batch Method to know its adsorption efficiency. Passing to the second level, of testing the adsorbent in a packed column, the adsorbent was carried to an inert matrix, giving way to the design and study of an adsorption column packed with inert matrix and Al doped MNPs, different supports were studied to pack the column and initiate the filtration of solids [6]. For the design of the columns, borosilicate glass tubes were used. In order to evaluate the adsorption capacity of the columns, an experimental design of factorial type 2^3 was utilized. The experiments were carried out continuously. Each test was performed in duplicate. The treated water was analyzed by plasma emission spectrometry (ICP) to determine the remaining concentration of As and F. To verify the presence of As and F on the surface of Al- doped MNPs and matrix was used high- resolution transmission electron microscopy.

Keywords: Adsorption columns, Al doped- MNPs, Removal Fluoride and arsenic

References:

[1] R. Liu et al. Colloids and Surfaces A: Physicochem. Eng. Aspects 466 (2015) 147–153.
[2] M. Streat et al., Process safety and environmental protection, 86 (2008) 21–30.
[3] W. Li et al. Journal of Hazardous Materials, 198 (2011) 143–150.
[4] S. Lunge et al. Journal of Magnetism and Magnetic Materials 356 (2014) 21–31.
[5] [2] B.E. Monárrez- Cordero et al. Journal of Alloys and Compounds, 615 (2014) S328–S334.
[6] N. Mohammeda et al. Carbohydrate Polymers 136 (2016) 1194–1202.

Presenting author's email: tricablan@hotmail.com

THE EFFECT OF Sn^{2+} DOPING ON THE CHARGE TRANSFER DYNAMICS AT HEMATITE PHOTOELECTRODES

Ingrid Rodríguez-Gutiérrez[a], Lyu Xincong[b], Rodrigo García-Rodríguez[a], Alberto Vega[a], Geonel Rodríguez-Gattorno[a], Wey Yang Teoh[b], Gerko Oskam[a].

[a]*Centro de Investigación y Estudios Avanzados del IPN (CINVESTAV-Mérida). Km 6 Antigua Carretera a Progreso CP. 97130, Mérida Yuc. México.*

[b]*Clean Energy and Nanotechnology (CLEAN) Laboratory, School of Energy and Environment, City University of Hong Kong, Kowloon, Hong Kong S.A.R.*

The search for good photoactive materials that can accomplish direct or indirect water photoelectrolysis has led to the study of many new material combinations. However, the improvement of known materials such as TiO_2, WO_3 and Fe_2O_3 is still a very active field because a deeper understanding of the physical, chemical and electrical properties is needed for further progress in this topic. Hematite (?-Fe_2O_3) is regarded as a promising candidate for photoelectrochemical solar water splitting due to its abundance, low cost, and favorable band gap (2.0?2.2 eV) [1], but it presents some disadvantages such as poor electrical conductivity, a short hole diffusion length, and slow water oxidation kinetics [2]. To improve the photoelectrochemical performance, doping is one of the most common strategies to improve carrier transport and/or reduce bulk recombination in hematite [3]. Various dopants such as Ti4+, Si4+, and Sn4+ have been used to enhance the conductivity in hematite [4].

In this work, we studied the effect of Sn2+ doping of hematite on the photoelectrochemical charge transfer dynamics using electrochemical impedance spectroscopy (EIS) and intensity-modulated photocurrent spectroscopy (IMPS). The results provide a new insight into the kinetics of charge transfer processes at hematite electrodes.

Keywords: Photoelectrochemical water splitting, hematite, small-signal perturbation methods

References:

[1] Steier, L.; Luo, J.; Schreier, M.; Mayer, M. T.; Sajavaara, T.;Gratzel, M., *ACS Nano*, 2015, 9, 11775?11783.

[2] Xi, L.; Chiam, S. Y.; Mak, W. F.; Tran, P. D.; Barber, J.; Loo, S. C. J.; Wong, L. H., *Chem. Sci*. 2013, 4, 164.

[3] Chiam, S. Y.; Kumar, M. H.; Bassi, P. S.; Seng, H. L.; Barber, J.; Wong, L. H., *ACS Appl. Mater. Interfaces* 2014, 6, 5852?5859.

[4] Qin, D. D.; Li, Y. L.; Wang, T.; Li, Y.; Lu, X. Q.; Gu, J.; Zhao, Y. X.; Song, Y. M.; Tao, C. L., *J. Mater. Chem. A,* 2015, 3, 6751?6755.

Presenting author's email: ingrid.rodriguez@cinvestav.mx

ANALYSIS OF POLYMORPHOUS SILICON THIN FILMS FOR APPLICATIONS IN SOLAR CELLS

Javitt Linares[1], Alejandra López-Suárez[2], Michel Picquart[3], Guillermo Santana[1.], B. Marel Monroy[1].
[1] Departamento de Materiales de Baja Dimensionalidad, Instituto de Investigaciones en Materiales, UNAM, Circuito Exterior s/ n, C.U., A. P. 70-360, Coyoacán, 04510, México, D.F.

It has been shown that thin film of polymorphous silicon (pm-Si:H) materials have considerable adventages in absorption, photoconductivity and photostability with respect to conventional amorphous silicon, because pm-Si:H has nanometer sized crystalline Si inclusions embedded in an amorphous silicon matrix. These are attractive properties for the photovoltaic industry. The structure of pm-Si:H improves the transport properties with respect to amorphous silicon, even after being in a prolonged exposure to solar radiation. In this work pm-Si:H was synthesized by plasma enhanced chemical vapor deposition PECVD. Dichlorosilane was used as silicon precursor gas diluted in H_2 and Ar. In order to obtain different structural configurations of pm-Si:H films, the H_2 flow rate was varied from 20 to 100 sccm and the deposition temperature was varied from 150°C to 300°C. The films were characterized by Raman spectroscopy and UV-visible transmission/reflection. Transport properties were also studied by photoconductivity measurements. The crystalline fraction, the size of the Si nanocrystals and the optical gap was obtained for each sample. These structural and optical properties were correlated to the observed transport properties. The possible application of these materials to solar cell structures is also discussed.

Keywords: Polymorphous silicon, Solar cells, PECVD

Presenting author's email: gsantana@iim.unam.mx

SELECTIVE COATINGS FOR SOLAR-TO-THERMAL ENERGY CONVERSION

F. I. Lizama-Tzec[1], J.J. Becerril-Gonzalez[1], L.F. Pinzón-Espinos[a1], A. M. Castro-Chong[1], J. D. Macías[1], D.M. Herrera-Zamora[1], M. A. Estrella-Gutiérrez[1], O. Arés-Muzio[1], J. J. Alvarado-Gil[1], R. de Coss[1] and G. Oskam[1]
[1]Department of Applied Physics, CINVESTAV-IPN, Mérida, Yuc. 97310, México

Selective coatings for solar-to-thermal energy conversion are characterized by high solar absorptance and low thermal emittance, and their composition and properties are defined by the operating temperature of the desired application.
In this work, we present the preparation and characterization of selective coatings for low, medium and high temperature applications. For low and medium temperatures, the selective coatings are obtained by electrodeposition onto stainless steel or copper, and the coatings are generally based on a nickel infrared reflective interlayer between the metallic substrate and a black cobalt or black nickel as absorber film. Selective coatings for high temperature applications are prepared by sputtering onto stainless steel. The selective coatings are based on molybdenum interlayer between the metallic substrate and a multilayer of molybdenum-alumina as the absorber film. The optical properties of the coatings are characterized by total reflectance spectroscopy in the UV-Vis and the infrared regions, using integrating spheres. The morphology is studied with scanning electron microscopy (SEM), and X-ray photoelectron spectroscopy (XPS) and Raman spectroscopy were used to determine the surface composition of the black absorber layers. The crystalline structure of the films was studied by X-ray diffraction (XRD). In addition, we are developing methodologies and the necessary conditions to scale-up both techniques to functional devices in such way that the coatings optimized for small samples can be reproduced on large area substrates for solar collectors.

Keywords: Electrodeposition, Sputter deposition, Solar-Thermal Energy Conversion

References:

1.- Guangjie Gong, Xinyan Huang, Jun Wang, Menglong Hao. Solar Energy 84 (2010) 2230-2245.
2.- F. I. Lizama-Tzec, J. D. Macías, M. A. Estrella-Gutiérrez, A. C. Cahue-López, O. Arés, R. de Coss, J. J. Alvarado-Gil, G. Oskam*, J. Mater Sci: Mater Electron*, 26, 8, 5553-5561, (2015).
3.- D.M. Herrera-Zamora, F.I. Lizama-Tzec, O. Arés and G. Oskam, ECS Transactions, 69(31), 7-13 (2015).

Presenting author's email: flizama101@gmail.com

GREEN MATERIALS FROM FOOD WASTE AND WEEDS.

Mendoza- Anzorena A.M. [1], Mendoza- Anzorena D.J. [1], Ramirez- Rivera D.K. [1], Ramos- López E. [1], Mercader- Trejo F. [1], Rodríguez- López A. [1], Corzas- Corona E. [2], Herrera- Basurto R. [2]

[1]Universidad Politécnica de Santa Rosa Jáuregui, Carretera Federal 57 QRO- SLP Km. 31 + 150, Santa Rosa Jaureguí, 76220 Santiago de Querétaro, Qro. [2] Universidad Aeronáutica en Querétaro, Depto. Investigación y Posgrado, Carretera Estatal Querétaro- Tequisquiapan 22154, 76270 Colón, Qro.

Biopolymers and natural fibers have become a green alternative to replace non- degradable materials derived from fossil fuels. Within the fibers that have been used as reinforcement for the development of new green composites are jute, sisal, kenaf, flax, hemp, wood, varieties of grass, among others [1].On the other hand, an as the array has been studying the use of thermoplastic biopolymers made from the starch of different plants through the addition of plasticizers such as polyols, sorbitol, and the water [2].This work presents results of the synthesis of nanofiber and nanoparticles of cellulose from plants called weeds, as well as the obtaining of a thermoplastic biopolymer of starch potatoes. Then, we show the combination process of both components to get a composite biomaterial, used the nanocellulose as reinforcement material and the biopolymer as the matrix. Likewise, will present results of the evaluation of the mechanical properties, size, morphology and correlation between biopolymer and nanocellulose. Will see a comparison between the new material and commercial materials apply in the automotive and aerospace sectors.

Keywords: Nanocellulose, biomaterial, composite

References:

1. J. Sahari, S. M. Sapuan, Natural fibre reinforced biodegradable polymer composites, Rev. Adv. Mater. Sci., 30, 2011, 166- 174
2. A. Wattanakornsiri, S. Tongnunui, Sustainable Green composites of thermoplastic starch and cellulose fibers, Songklanakarin J. Sci. Technol, 36(2), 2014, 149- 161.

Presenting author's email: raul.herrera@unaq.edu.mx

THIRD-GENERATION SOLAR CELLS: FUNDAMENTALS AND SCALE-UP OF DYE-SENSITIZED AND PEROVSKITE SOLAR CELLS

Dena Pourjafari[1], Renan Escalante[1], Esdras Canto[1], Carlos González[1], Rodrigo García[1], Alberto Vega[1], Karen Valadez[1], Alejandra Castro[1], Gerko Oskam[1]

[1]Department of Applied Physics, CINVESTAV-IPN, Antigua Carretera a Progreso km 6, Mérida, Yucatán 97310, México.

Third-generation photovoltaics have had an impact on the accelerated implementation of solar energy, however, in an indirect way. Related to very strong efforts focused on the fabrication of low cost solar cells, the use of earth-abundant materials, inexpensive fabrication processes and short energy payback time, the silicon photovoltaics industry has managed to markedly decrease the cost of solar panels. Implementation of third-generation devices, in particular the dye-sensitized solar cell and the hybrid perovskite solar cell, is still not at a commercial level, also related to the strong competition of silicon solar panels, however, there are still many niche applications for third-generation devices, and the development of tandem systems has promise to increase the efficiency of commercial photovoltaics. The dye-sensitized solar cell is a unique system, combining nanomateriales, molecular dyes, and redox electrochemistry, and research on transport and recombination processes in this complex system has resulted in very useful knowledge applicable to other nanosystems. The recent development of the hybrid perovskite solar cell highlights the advances, combined with a high efficiency, reaching 22%, which is spectacular for a third-generation system. In this work, we present an overview of our research on the fundamental processes governing the performance of dye-sensitized solar cells, showing the influence of the properties of the nanomaterial, the dye, the electrolyte solution, and we present initial results on scale-up. In addition, we describe the transport and recombination kinetics for this interesting system. For the perovskite solar cells, we illustrate the triple-stack concept for all-printed solar cells, and we discuss the influence of low-temperature processing methods for the deposition of the mesoporous film on the device performance. Preliminary results on the incorporation of hybrid perovskite nanoparticles in metal organic frameworks will be presented.

Keywords: Third-generation solar cells, dye solar cells, perovskite solar cells

References:

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Presenting author's email: dpourjafari@cinvestav.mx

DIRECT MICROEMULSION POLYMERIZATION AND SOL-GEL COMBINED SYNTHESIS TO PRODUCE AlO(OH)-PMMA NANOCOMPOSITE FOR PHENOL PHOTODEGRADATION

G. Castellanos[1], V. V. Fernández[1], J. Aguilar[1], F. Tzompantzi[2], G. G. Carbajal-Arizaga[1], C. Velásquez[1], A. Barrera[1,]

[1]Laboratorio de Nanomateriales Catalíticos, CUCI, Universidad de Guadalajara, Av. Universidad, Núm. 1115, Col. Lindavista, Ocotlán Jalisco, C.P. 47820, México.[2] Departamento de Química, Universidad Autónoma Metropolitana-Iztapalapa, Cd. de México, 09340, México.

Abstract Advanced oxidation processes (AOP) are technologies which take advantage of the properties of semiconductor materials and in the last decades they have attracted attention in fields such as energy conversion and environmental remediation. The photocatalytic process also named photocatalysis has been a viable alternative for the photodecomposition of pollutant organic molecules in aqueous solution and it is based in the irradiation of UV or visible light over semiconductor metal oxides that produce electron-hole recombination which promotes the complete mineralization of the organic pollutant compound. Nevertheless, one of the main disadvantages of heterogeneous photocatalysis holds that the catalysts are applied in powder form, limiting its recovery and reuse capacity at the end of the reaction cycles. As a way to confront this technological limitation, it has been proposed to immobilize the catalyst into substrates such as glass fibers, silicates, textiles or to incorporate them into polymers. In order to study the interaction between a photocatalytically active inorganic phase and a polymer matrix in the present work we report UV photoactive powder nanocomposites of bohemite (AlO(OH)) and polymethylmethacrylate (PMMA) synthesized by a two-step simple process. At a first stage were synthesized PMMA nanoparticles by direct microemulsion polymerization and secondly the nanocomposite (Al-PMMA x, where x= 100°C, 300°C temperature treatment) synthesis by the sol-gel methodology. The characterization process was carried out by the analysis of nitrogen physisorption, X-ray diffraction, Raman, UV-Vis and FT-IR spectroscopies. The photocatalytic activity test in the degradation of phenol (10 ppm) was carried out using a batch-type glass photoreactor and a UV power supply lamp as irradiation source. The temperature of treatment promotes the improvement in the specific surface area BET (~400 m^2/g) and also a considerable upturn in the photocatalytic activity of the Al-PMMA 300°C reaching 58% of photodegradated phenol at 80 min of UV irradiation.

Keywords: Nanocompositos, bohemite (AlO(OH)) and polymethylmethacrylate (PMM, photodegradation of phenol

Presenting author's email: arturobr2003@yahoo.com.mx

PHOTOCATALYTIC DEGRADATION OF METHYLENE BLUE OVER MIXED OXIDES ZnAl AND ZnAlGa FROM LAYERED DOUBLE HYDROXIDES.

Hernández-Amezcua[1], A. Barrera[1], F. Tzompantzi[2], S. G. Castellanos[1], C. Velasquez[3] and V.V.A. Fernández[4]

[1]Laboratorio de Nanomateriales Catalíticos, CUCI, Universidad de Guadalajara, Av. Universidad, Núm. 1115, Col. Lindavista, Ocotlán Jalisco, C.P. 47820, México. [2]Departamento de Química, Universidad Autónoma Metropolitana-Iztapalapa, Cd. de México, 09340, México. [3]Centro Universitario de los Valles, Universidad de Guadalajara, Carretera Guadalajara - Ameca Km. 45.5 C.P. 46600. Ameca, Jalisco, México. [4] Departamento de Ciencias Tecnológicas, Universidad de Guadalajara, Av. Universidad #1115, 47810, Ocotlán, Jal., México.

Layered double hydroxides (LDHs), also known as hydrotalcite like compounds, are attractive materials due to its unique structure with metallic cations in layer form as well as for its ability to host anions intercalated between these layers. LDHs are excellent precursors to develop new photo-functional materials, through thermal treatments, because of its comparatively easy preparation, stability in air and ability to interchange anions, such as mixed oxides [1]. It has been reported that ?-Ga_2O_3 shows much higher photo-activity than TiO_2 [2]. The present work investigates the role of ?-Ga_2O_3 in ZnAl mixed oxides to photo-degrade methylene blue, a common dye used in printing, textile and photographic industries, known to cause several types of toxicity towards humans and animals [1]. Mixed oxides of ZnAl-x in a molar ratio of 3:1 (Zn/Al) and ZnAlGa-x with 1 mol% of Ga^{3+} from layered double hydroxides were synthesized by co-precipitation method with urea as precipitating agent, where x is the treatment temperature in Celsius degrees (100°C, 550°C). The solid materials were characterized by nitrogen physisorption, X-ray diffraction, Raman and fluorescence spectroscopies. The photo-catalytic activity test in the degradation of methylene blue in aqueous medium (12 ppm) was carried out using a batch-type glass photo-reactor and an UV power supply lamp as irradiation source. Results of photo-catalytic activity test show that the LDHs ZnAl and ZnAlGa treated at 100°C do not present activity whatsoever. In contrast, mixed oxides of ZnAl and ZnAlGa treated at 550°C show a photo-conversion of 78.0% and 100.0% of methylene blue after 1 hour of UV irradiation, respectively.

Keywords: Methylene blue, Mixed oxides, Photocatalysis

References:

[1] Priyadarshi Roy Chowdhury and Krishna G. Bhattacharyya, “Ni/Ti layered double hydroxide: Synthesis, characterization and application as a photocatalyst for visible light degradation of aqueous methylene blue”, Dalton Transaction., 2015.
[2] S.I. Stepanov, V.I. Nikolaev, V.E. Bougrov and A.E. Romanov, “Gallium oxide: Properties and applications - a review”, Rev. Adv. Mater. Sci.jk 44, p. 63-86, 2016.

Presenting author's email: josue.latin19g@gmail.com

CARBON NANOTUBES OR COBALT EXPOSURE RESULTS IN OXIDATIVE DAMAGE AND INFLAMMATION IN HACAT CELLS

Roberto E. Galván-Juárez[1], Irais Poblete-Naredo[1], José E. Garrido-Guerrero[2] and Arnulfo Abores[1]

[1]Departamento de Toxicología; [2]Departamento de Genética y Biología Molecular. Cinvestav-IPN. San Pedro Zacatenco, Ciudad de México. México.

Carbon nanotubes (CNT) are nano-materials with novel properties and applications associated with some toxicological effects on skin as a target organ, probably mediated through oxidative stress that may result from metal contamination. Cobalt (Co), is a catalyzer used for CNT fabrication that remains in the product as impurity, thus, we compared single wall carbon nanotubes (SWCNT) suspensions containing Co (<3%) with equimolar Co solutions by assessing their oxidative capacity and cell effects; using a keratinocytes cell culture (HaCaT) cells, the reactive oxygen species (ROS) production and the measurement of inflammatory interleukins (IL-6 and IL-8) mRNA expression. Non-biological oxidative response of Co-SWCNT suspensions at 50 µg/ml (25.45 µM of Co), displayed a higher oxidative potential than Co alone in solution (1.5 µg/ml=25.45 µM) as measured by the capacity of oxidize dithiothreitol (DTT). Biologically, neither Co-SWCNT nor Co solutions had effect on HaCaT viability. Co-SWCNT showed a high oxidative potential estimated by the dichlorofluorocein diacetate (DCFDA) assay, while Co alone did not. In contrast, Co-SWCNT resulted in a lower IL-6 and IL-8 mRNA expression induction after 1 or 3 h, respectively, then, compared with the effects of Co solution. In summary, Co-SWCNT displayed a greater oxidative capacity than Co. When tested in HaCaT, ROS production was higher when treated with Co-SWCNT, but interleukin induction was higher with Co solution alone. Differences in time and magnitude of the effects between Co-SWCNT and Co solutions are associated to the physicochemical properties of the carbonaceous structure SWCNT and probably by the gradual Co release from the CNT mesh, influencing in the activation of diverse cell pathways by itself or trough receptors stimulation, that lead in the activation of some Transcription factors immune-related with or without the involvement of ROS.

Keywords: Single walled carbon nanotubes (swcnt), cobalt, skin and toxicity

Presenting author's email: rgalvanj@cinvestav.mx

IDENTIFICATION AND EFFECTS OF LONG-LIVED SUPEROXIDE RADICALS ON THE SURFACE OF PHOTO-EXCITED TiO_2 AND OTHER METAL OXIDE NANOPARTICLES

Dabin Wang[1], Dan Wang[1], Lixia Zhao[1], Liang-Hong Guo[1]
[1]State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, P.O. Box 2871, 18 Shuangqing Road, Beijing 100085, China

Reactive oxygen species (ROS) play an essential role in the semiconductor photocatalytic conversion of chemicals. ROS is usually short-lived and rarely utilized efficiently. In this work, surface-adsorbed, long-lived superoxide radicals ($O_2^{\bullet-}$) were identified in UV-irradiated aqueous suspensions of TiO_2 and other metal oxide nanoparticles by chemiluminescence detection. Using a constructed kinetics model for the decay process of $O_2^{\bullet-}$, the half-life of the radical on the semiconductor surface was obtained, which follows the order of TiO_2 > ZnO > SnO_2 > CeO_2 > Fe_2O_3. The longest half-life of 1274 seconds was obtained on anatase TiO_2, which is over 100 times longer than the radicals in solution. Using nitrobluetetrazolium as a target chemical in photocatalytic conversion, it was found that half of the molecules were reduced by the surface-adsorbed $O_2^{\bullet-}$. The finding of surface-stabilized, long-lived superoxide radicals may have important implications in the chemistry, biology and toxicology of these radicals.

Keywords: Photocatalysis, Metal Oxide Nanoparticles, Superoxide radical

Presenting author's email: LHGuo@rcees.ac.cn

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The organizers thank MDI Eva Edith Romo Bernal for assistance with the NANOMXCN 2017 Graphic Identity.


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