

Nanotechnology and the Environment

A symposium sponsored by the Division of Industrial and Engineering Chemistry (I&EC) at the 229th American Chemical Society National Meeting

**Manchester Grand Hyatt
One Market Place
San Diego, California
92101 USA
March 13-17**

Manchester Grand Hyatt Regency -- Del Mar A-B

Sunday, March 13, 2005

9:00 AM-11:35 AM

Nanotechnology and the Environment

Presiding: Barbara Karn

9:00 AM 1 Progress in nanotechnology and the environment

Barbara Karn

9:30 AM 2 Research strategy for nanomaterials risk assessment

Michael J. Davis

10:00 AM 3 Non-Governmental organizations panel: a look at the environmental, human health and societal aspects of nanotechnology

Nora F. Savage

11:30 AM Concluding Remarks

12:45 PM-4:05 PM

Toxicology and Biological Interactions of Nanomaterials

Presiding: Kevin Dreher

12:45 PM 11 Impact of a C60 water suspension on bacteria

D. Y. Lyon, J.D. Fortner, J.B. Hughes, P. J. Alvarez

1:10 PM 12 Bio-nano interface: Examining the interactions between water-soluble fullerenes and biological membranes

Christie M. Sayes, Kevin D. Ausman, Jennifer L West, Vicki L. Colvin

1:35 PM 13 Carbon nanotubes delay slightly the hatching time of zebrafish embryos

Shuk Han Cheng, Jinping Cheng

2:00 PM 14 Comparative toxicity of nanomaterials in vitro and in vivo

Anna A Shvedova, Ashley R Murray, Vic J. Johnson, Olga Gorelik, Sivaram Arepalli, Ann Hubbs, Robert R. Mercer, Paul Baron, Andrew D. Maynard, Valerian E. Kagan, Alla I. Potapovich, Vincent Castranova, Elena Kisim

2:25 PM 15 Impact of titania and quartz nanoparticulate exposures on respiratory health: Role of particle size

David B Warheit, Thomas R. Webb, Kenneth L Reed, Christie M. Sayes, Vicki L. Colvin

2:50 PM 16 Skin exposure to nanoparticles

- Sally S. Tinkle*
3:15 PM 17 Multi-walled carbon nanotube exposure in human epidermal keratinocytes: Localization and proteomic analysis
Nancy A. Monteiro-Riviere
3:40 PM 18 Use of phosphoproteomic molecular network analysis for nanoparticle toxicity assessment
David Geho, Julia Wulfkuhle, Valerie Calvert, Lance Liotta, Emanuel Petricoin

Monday, March 14, 2005

8:30 AM-11:10 AM

- Treatment/Remediation using Nanotechnology I Presiding: Robert J. Hamers**
8:30 AM 90 Dispersion of Zero-valent Iron Nanoparticles
Yuan-Pang Sun, Wei-xian Zhang
8:50 AM 91 Investigations of factors influencing the properties of metallic iron nanoparticles
Paul G. Tratnyek, D. R. Baer, James T. Nurmi, Vaishnavi Sarathy, John C. Linehan, James E. Amonette, R. Lee Penn, You Qiang
9:10 AM 92 ZnO nanostructures as smart materials for simultaneous detection and degradation of carboxylic acids
Vaidyanthan Subramanian, Prashant V. Kamat
9:30 AM 93 Nanobiotechnology for enzymatic remediation and soil carbon sequestration
Jungbae Kim, James E. Amonette, Colleen K. Russell
9:50 AM 94 Size-reactivity relationship of iron and cobalt oxyhydroxide nanoparticles assembled within ferritin protein
Daniel R. Strongin, Hazel Ann Hosein, Sudeep Debnath, Gang Liu
10:10 AM 95 Integrated ultrafiltration/nanofiltration process for reclamation of wastewater from metal plating industry
Jian-Jun Qin, Maung-Nyunt Wai, Maung-Htun Oo
10:30 AM 96 Dual-Phase Membrane for Carbon Dioxide Separation at High Temperature
Jung Hoon Park, Seung Joon Chung, Duo Li, Jerry Y. S. Lin
10:50 AM 97 Synthesis of nanostructured pristine and doped titanium dioxide for oxidizing contaminants in air
Pratim Biswas, Kuk Cho, Myonghwa Lee, Christopher Hogan

1:30 PM-3:50 PM

- Nanotech-Enabled Green Energy Sources Presiding:Rama Venkatasubramanian**
1:30 PM 111 Nanotechnology enabling green energy
Michael J. Heben
2:30 PM 113 Monte Carlo simulations of the hydrogen adsorption in multiwall carbon nanotubes
Naiping Hu, Xiaoyang Sun, Andrew Hsu
2:55 PM 114 Nano-thermal effects for energy conversion
Arun Majumdar
3:20 PM 115 Fuel Cells - An Environmentally Benign Energy Technology of the Future
C. C. Lee, G. L. Huffman
3:45 PM Concluding Remarks
4:00 PM-5:30 PM

**Nomenclature, Measurement, and Standards for Nano-sized Materials Presiding:
Vicki Colvin**

4:00 PM 116 Naming nanotechnology: Creating a dictionary for the
nanoscale Vicki L. Colvin

Tuesday, March 15, 2005

8:15 AM-12:30 PM

Nano-Catalysis for Greener Technologies Presiding: S. Ismat Shah

8:15 AM 123 Ceria nanoparticles in environmental catalysis: Effects of
Zr-doping and Au deposition

Jose A. Rodriguez

8:45 AM 124 Size and doping effect on structural and photocatalytical
properties of TiO₂ nanoparticles

S. Ismat Shah

9:15 AM 125 Novel nanostructured solids for applications in
environmental catalysis and gas sensing

M. Ishaque Khan

9:45 AM 126 Novel photocatalytic nanocomposite systems based on
anatase TiO₂ for environmental remediation

Wolfgang M. Sigmund, Sung-Hwan Lee, Georgios Pyrgiotakis, Seungwoo Lee

10:15 AM Intermission

10:30 AM 127 Preparation of nanocrystalline TiO₂ particles, films and
membranes using ionic liquids and surfactant-assisted sol-gel methods

Hyeok Choi, Dionysios D. Dionysiou

11:00 AM 128 Transition metal carbide nanoparticles as alternative
catalysts for automobile catalytic converter

Abdul Rumaiz, S. Ismat Shah, J.G. Chen

11:30 AM 129 Preliminary observations of bacterial responses to
photocatalytic nano-TiO₂ particles

C. P. Huang, Ayca Erdem, Mingyu Lin, Yu-chu Huang, Daniel Cha, Ismat Shah

12:00 PM Concluding Remarks

1:30 PM-4:00 PM

Environmentally Benign Nanocomposites Presiding: Lawrence T. Drzal

1:30 PM 139 Conductive green nanocomposites from
poly(hydroxybutyrate) and expanded graphite processed using environmentally friendly
ionic liquids

Dana G. Miloaga, Lawrence T. Drzal, Manjusri Misra

1:55 PM 140 Ecocomposites using cellulose based nanocomposites

William T. Winter, Yae Takahashi

2:20 PM 141 Nanostructure of the biodegradable cellulose acetate/clay
nanocomposites by atomic force microscopy

Hwan-Man Park, Xuemei Liang, Amar K. Mohanty, Manjusri Misra, Lawrence T. Drzal

2:45 PM 142 Novel green nanocomposites from toughened bacterial
bioplastic and titanate based organo-modified clay

Yashodhan S. Parulekar, Amar K. Mohanty

3:10 PM 143 Synthesis, characterization, and manipulation of {FeS-
PAMAM} dendrimer nanocomposites

Xiangyang Shi, *Lajos Balogh*

3:35 PM 144 Green chemistry considerations in the enzymatic construction of conductive nanocomposites

Sofia Trakhtenberg, John C. Warner, Jayant Kumar, Lynn Samuelson, Ferdinando F Bruno, Ramaswamy Nagarajan, Yelda Hangun-Balkir

Wednesday, March 16, 2005

8:30 AM-11:10 AM

Fate/Transport of Nano-Structured Materials Presiding: Ronald Turco

8:30 AM 151 C60 aggregates in water: Formation dynamics and further characterization

J.D. Fortner, Joshua C. Falkner, E.M. Hotze, D. Y. Lyon, Christie M. Sayes, Kevin D. Ausman, Vicki L. Colvin, J.B. Hughes

8:50 AM 152 Solubility of buckminsterfullerene (C60) in solvent mixtures

Pradnya P Kulkarni, Chad T. Jafvert

9:10 AM 153 Uptake and sequestration of environmental contaminants by C60 fullerene, activated carbon, and soil OC

Xuekun Cheng, Amy T. Kan, Mason B. Tomson

9:30 AM 154 Sorption/desorption of arsenic to magnetite nanoparticles

Sujin Yean, Lili Cong, Amy Kan, Vicki Colvin, Mason Tomson

9:50 AM 155 Effect of carbon-based manufactured nanoparticles (CMNP) on microbial communities

Loring F. Nies, *Leila M. Nyberg*, Zhonghua Tong, Marianne Bischoff, Ronald F. Turco

10:10 AM 156 Bioavailability of chemicals commercially available as nanoparticles

Anne Anderson, C D Miller, JE McLean

10:30 AM 157 Pathological Evidence of Interactions of Environmental Micro and Nanoparticles in Humans

Antonietta M. Gatti, Stefano Montanari

10:50 AM 158 Public Education about Fate-Transport of Nano-structured Materials

Natalie Carroll

1:30 PM-4:10 PM

Treatment/Remediation using Nanotechnology II Presiding: Stephen M.C. Ritchie

1:30 PM 166 Near-Field Scanning Microspectrometers for nanospectroscopy applications

Amanda L. Jenkins, *Richard A. Larsen*, Yoshihito Narita

1:50 PM 167 Novel products from the degradation of lindane by nanoscale zero valent iron

Daniel W. Elliott, Stephen T. Spear, Wei xian Zhang

2:10 PM 168 Bimetallic Nanoparticles: Membrane-Based Synthesis for Applications to PCB and TCE Dechlorination

Dibakar Bhattacharyya, Jian Xu, Leonidas Bachas, David Meyer, Y Tee

2:30 PM 169 Applications of nanoscale tunable biopolymers for heavy metal remediation

U Loi Lao, Alin Chen, Ashok Mulchandani, Wilfred Chen

- 2:50 PM 170 Recovery of Metal Ions from High Ionic Strength Aqueous Solutions by Dendrimer Enhanced Ultrafiltration
Mamadou Diallo, Sa'Nia Carasquero, Pirabalina Swaminathan, James H. Johnson Jr., William A. Goddard III
- 3:10 PM 171 Adsorption of arsenic onto metal oxide and hydroxide nanoparticles
Paul K. Westerhoff, Kiril Hristovski
- 3:30 PM 172 In situ remediation of heavy metal contamination using emulsified nano- and microscale metal particles
Kristen M. Milum, Cherie L. Geiger, Christian A. Clausen, Robert DeVor, Jacqueline Quinn
- 3:50 PM 173 Spherical nanocrystalline aggregates of metal and metal oxides for heavy metal ion remediation
Satish Kuriyavar, Allen W. Apblett

Thursday, March 17, 2005

8:30 AM-12:15 PM

Environmentally Benign Nanomanufacturing Presiding: James E. Hutchison

- 8:30 AM 182 Environmentally-benign nanomanufacturing: Merging green chemistry and nanoscience
James E. Hutchison
- 9:00 AM 183 Microwave-induced, "green" and rapid chemical functionalization of single-walled carbon nanotubes
Yubing Wang, Somenath Mitra, Zafar Iqbal
- 9:30 AM 184 Cellular biosynthesis of nanostructured semiconductor materials
Gregory L. Rorrer, Chih-hung Chang, Clayton Jeffryes, Shu-hong Liu, Timothy Gutu, Jun Jiao
- 10:00 AM Intermission
- 10:15 AM 185 Au-nanoparticle arrays fabricated by biomolecular nanolithography and molecular self-assembly
Gregory J. Kearns, Evan W. Foster, James E. Hutchison
- 10:45 AM 186 A New Chemical Approach for High Fidelity, Nano-Scale Soft Lithography
Kyung M. Choi, John A. Rogers
- 11:15 AM 187 Establishing Environmentally Benign Manufacturing Protocol at the High Rate Nanomanufacturing Center
Pamela A Civie, Michael J. Ellenbecker
- 11:45 AM Concluding Remarks
- 1:30 PM-3:30 PM

Nanotech-Enabled Sensors & Sensor Systems for Substances of Environmental Interest Presiding: Michael J. Sailor

- 1:30 PM 188 Self-Assembly of Carbon Nanotubes in a Microtrap for on-Line Preconcentration of Volatile Organics
Chutarat Saridara, Roman Brukh, Zafar Iqbal, Somenath Mitra
- 1:50 PM 189 Determination of benzene and toluene nitration mechanism in zeolites
Amity Andersen, Niranjan Govind, Lalitha Subramanian
- 2:10 PM 190 Carbon-Nanotube Based Electrochemical Sensors

Joseph Wang Sr.

2:30 PM 191 Detection of heavy metal ions in drinking water using
conducting polymer nanojunctions

*Alvaro Díaz Aguilar, Erica S. Forzani, Xiulan Li, Larry A. Nagahara, Ishamshah Amlani,
Raymond Tsui, Nongjian Tao*

2:50 PM 192 Functionalized tetraphenylsilole nanoparticles as redox
sensors for carcinogenic Cr(VI) and As(V)

Sarah J. Toal, Mario Listiawan, Douglas Magde, William C. Trogler

3:10 PM 193 Individually addressable nanowires immunosensor array

*Ashok Mulchandani, Nosang Myung, Wilfred Chen, Mangesh Bangar, Kumaran
Ramnathan, Minhee Yun*