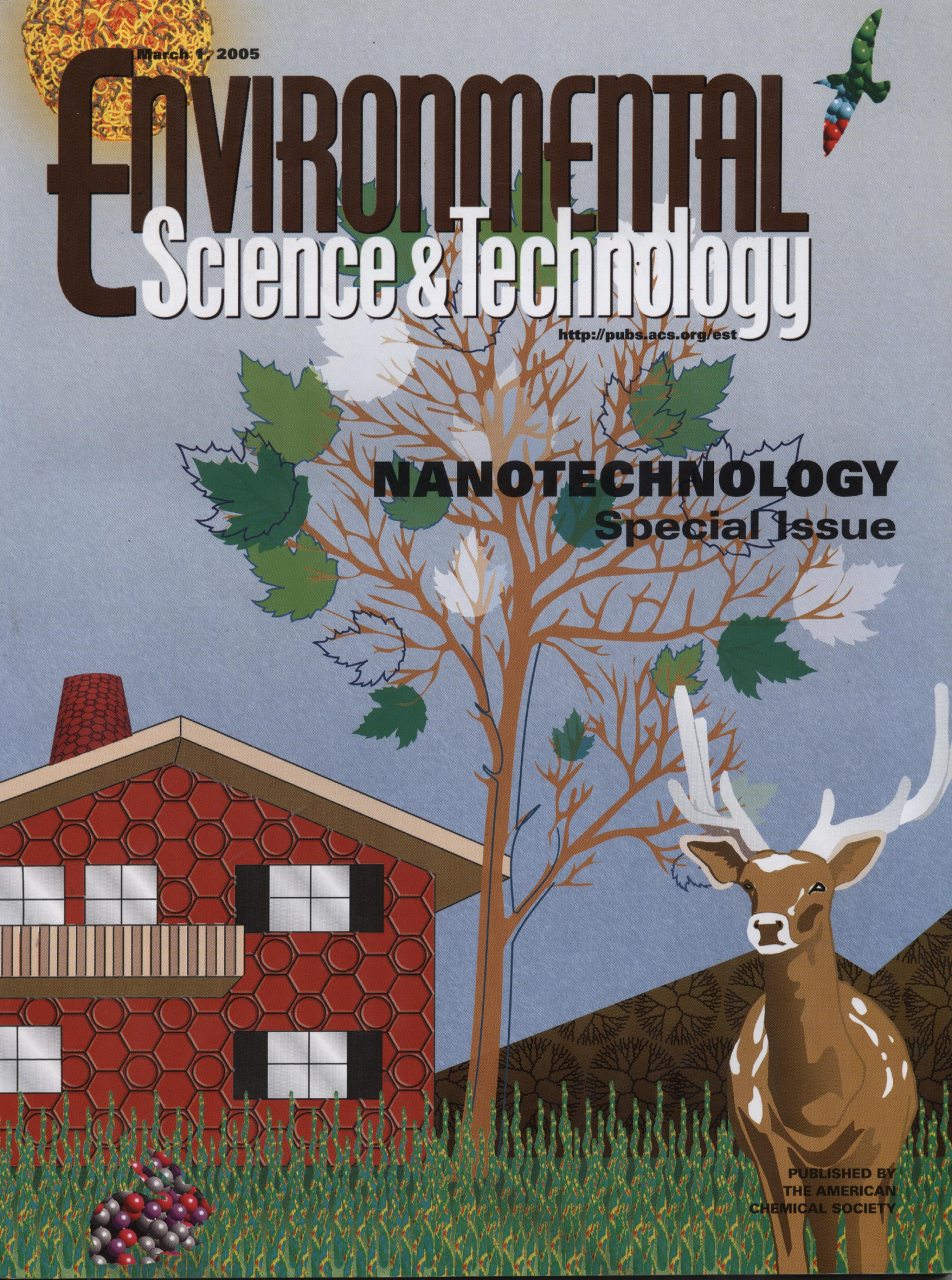


March 1, 2005

ENVIRONMENTAL Science & Technology

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NANOTECHNOLOGY
Special Issue



PUBLISHED BY
THE AMERICAN
CHEMICAL SOCIETY

1201

Preparation of a Novel TiO₂-Based p-n Junction Nanotube Photocatalyst

Yongsheng Chen, John C. Crittenden, Stephen Hackney, Larry Sutter, and David W. Hand

Template techniques can be used to synthesize a p-n junction nanotube photocatalyst, can increase catalytic activity, and have a potential to separate catalyst surfaces.

1209

Sensitive Detection of Sulfhydryl Groups in Surface-Confining Metallothioneins and Related Species via Ferrocene-Capped Gold Nanoparticle/Streptavidin Conjugates

Omar A. Jimenez, Sara Chikneyan, Alfred J. Baca, Jianxiu Wang, and Feimeng Zhou

Ferrocene-capped gold nanoparticle/streptavidin conjugates are used in conjunction with voltammetry to detect cysteines within surface-confined metallothioneins, a class of metalloproteins of environmental importance.

1214

Development of Improved Materials for Environmental Applications: Nanocrystalline NaY Zeolites

Weiguo Song, Gonghu Li, Vicki H. Grassian, and Sarah C. Larsen

Nanocrystalline NaY zeolites are new materials with potential environmental applications in emission abatement of nitrogen oxides, environmentally benign synthesis, and adsorption of pollutants.

■ 1221

Characterization and Properties of Metallic Iron Nanoparticles: Spectroscopy, Electrochemistry, and Kinetics

James T. Nurmi, Paul G. Tratnyek, Vaishnavi Sarathy, Donald R. Baer, James E. Amonette, Klaus Pecher, Chongmin Wang, John C. Linehan, Dean W. Matson, R. Lee Penn, and Michelle D. Driessen

A comprehensive characterization of two types of nano-sized Fe⁰ clarifies the many process variables that determine the reactivity of these materials with contaminants.

1231

High Resolution Electron Microscopy Structural Studies of Organo-Clay Nanocomposites

Dana Yaron-Marcovich, Yona Chen, Shlomo Nir, and Rene Prost

High-resolution transmission electron microscopy and X-ray energy-dispersive spectroscopy are used to conduct fine-scale structural and analytical studies of the intercalation of several organic cations and of the herbicide fluoridone into Na-montmorillonite clay.

■ 1239

Heteroepitaxial Nucleation and Oriented Growth of Manganese Oxide Islands on Carbonate Minerals under Aqueous Conditions

Young-Shin Jun, Treavor A. Kendall, Scot T. Martin, Cynthia M. Friend, and Joost J. Vlassak

Manganese oxide film growth on carbonates is studied; effects of substrate morphology, solution chemistry, and film-substrate lattice mismatch are investigated.

1250

Using a Surface Complexation Model To Predict the Nature and Stability of Nanoparticles

Keisuke Fukushi and Tsutomu Sato

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2. Effective now, all *ES&T* research papers must be submitted via the web (<https://paragon.acs.org/paragon/index.jsp>). Email submissions or paper copies will not be accepted.

The changes in stability and nature of nanoparticles that make surface complexes are theoretically discussed with a surface complexation model.

■ 1257

Detection of Heavy Metal Ions in Drinking Water Using a High-Resolution Differential Surface Plasmon Resonance Sensor

Erica S. Forzani, Haiqian Zhang, Wilfred Chen, and Nongjian Tao

A high-resolution differential SPR sensor for heavy-metal-ion detection in the ppt-ppb range is presented and is tested in drinking water for Cu²⁺ quantification.

1263

Quantification of the Oxidizing Capacity of Nanoparticulate Zero-Valent Iron

Sung Hee Joo, Andrew J. Feitz, David L. Sedlak, and T. David Waite

Oxidation of benzoic acid to hydroxybenzoic acids is used to quantify the oxidizing capacity of nanosized zerovalent iron particles.

1269

Adsorption Enhancement Mechanisms of Silica-Titania Nanocomposites for Elemental Mercury Vapor Removal

Erik Pitoniak, Chang-Yu Wu, David W. Mazyck, Kevin W. Powers, and Wolfgang Sigmund

Deposited mercury oxide on a novel silica-titania nanocomposite has a greater attraction to elemental mercury vapor, and this results in enhanced adsorption.

1275

Linker-Based Bio-Compatible Microemulsions

Edgar J. Acosta, Thu Nguyen, Anuradee Withayapanyanon, Jeffrey H. Harwell, and David A. Sabatini

Linker-based, biocompatible microemulsions are shown to have remarkable oil solubilization capacity and thus have great potential as environmentally friendly replacements for organic solvents.

1283

Use of Nanosized Catalysts for Transformation of Chloro-Organic Pollutants

Ishai Dror, Dana Baram, and Brian Berkowitz

A new method uses heterogeneous catalysis with metalloporphyrinogens immobilized in sol-gel matrices to transform anthropogenic, chloro-organic compounds.

1291

Removal of Arsenic(III) from Groundwater by Nanoscale Zero-Valent Iron

Sushil Raj Kanel, Bruce Manning, Laurent Charlet, and Heechul Choi

This research describes arsenic(III) removal from groundwater by laboratory-synthesized nanoscale zerovalent iron and its application in real field groundwater.

■ Supporting information is available free at <http://pubs.acs.org/est>.

1299

Axial Flow Cyclone for Segregation and Collection of Ultrafine Particles: Theoretical and Experimental Study

Yu-Du Hsu, Hung Min Chein, Tzu Ming Chen, and Chuen-Jinn Tsai

An empirical model composed of centrifugal force and diffusion depositions is established and used to fit collection-efficiency experimental data from a cyclone used to collect ultrafine particles.

1309

Field Demonstration of DNAPL Dehalogenation Using Emulsified Zero-Valent Iron

Jacqueline Quinn, Cherie Geiger, Chris Clausen, Kathleen Brooks, Christina Coon, Suzanne O'Hara, Thomas Krug, David Major, Woong-Sang Yoon, Arun Gavaskar, and Thomas Holdsworth

Results are presented of the first field-scale demonstration of nanoscale emulsified zerovalent iron to enhance in situ dehalogenation of dense, nonaqueous-phase liquids.

1319

Nanoporous Silica-Supported Nanometric Palladium: Synthesis, Characterization, and Catalytic Deep Oxidation of Benzene

Jin-Jun Li, Xiu-Yan Xu, Zheng Jiang, Zheng-Ping Hao, and Chun Hu

Nanoporous silica-supported nanometric palladium catalysts prepared with a postsynthesis grafting method are highly active in catalytic deep oxidation of benzene.

1324

Actinide Sequestration Using Self-Assembled Monolayers on Mesoporous Supports

Glen E. Fryxell, Yuehe Lin, Sandy Fiskum, Jerome C. Birnbaum, Hong Wu, Ken Kemner, and Shelley Kelly

The union of mesoporous ceramic oxides and self-assembled monolayers patterned with actinide-specific ligands has created a powerful new class of actinide sorbent materials.

1332

Incorporation of Hydroxypyridinone Ligands into Self-Assembled Monolayers on Mesoporous Supports for Selective Actinide Sequestration

Yuehe Lin, Sandra K. Fiskum, Wassana Yantasee, Hong Wu, Shas V. Mattigod, Erich Vorpapel, Glen E. Fryxell, Kenneth N. Raymond, and Jide Xu

Incorporating ligands that are specific for rare-earth cations into mesoporous silica via molecular self-assembly generates a powerful new class of sorbent material.

1338

TCE Dechlorination Rates, Pathways, and Efficiency of Nanoscale Iron Particles with Different Properties

Yueqiang Liu, Sara A. Majetich, Robert D. Tilton, David S. Sholl, and Gregory V. Lowry

The nanoparticle synthesis method and chemical composition, particularly the presence of boron, significantly affect the trichloroethene dechlorination reaction rate, pathways, and efficiency afforded by Fe⁰ nanoparticles.

1346

Designing Pd-on-Au Bimetallic Nanoparticle Catalysts for Trichloroethene Hydrodechlorination

Michael O. Nutt, Joseph B. Hughes, and Michael S. Wong

The trichloroethene hydrodechlorination activity of palladium metal increases by 2000 times when palladium is supported on gold nanoparticles.

1354

Engineered Polymeric Nanoparticles for Bioremediation of Hydrophobic Contaminants

Warapong Tungtittiplakorn, Claude Cohen, and Leonard W. Lion

Urethane acrylate precursor chain nanoparticles modified with poly(ethylene) glycol are used to enhance the release and bioavailability of phenanthrene from nonaqueous-phase liquids and soils.

1359

Fullerol-Sensitized Production of Reactive Oxygen Species in Aqueous Solution

K. D. Pickering and M. R. Wiesner

The relative production rate of reactive oxygen in aqueous solution sensitized by fullerol is measured and compared with known reactive oxygen sensitizers.

1366

Dendrimer Enhanced Ultrafiltration. 1. Recovery of Cu(II) from Aqueous Solutions Using PAMAM Dendrimers with Ethylene Diamine Core and Terminal NH₂ Groups

Mamadou S. Diallo, Simone Christie, Pirabalini Swaminathan, James H. Johnson, Jr., and William A. Goddard, III

A proof-of-concept study is discussed of dendrimer-enhanced ultrafiltration as a novel separation process for recovering metal ions such as Cu(II) from aqueous solutions.

1378

Cytotoxicity of Carbon Nanomaterials: Single-Wall Nanotube, Multi-Wall Nanotube, and Fullerene

Guang Jia, Haifang Wang, Lei Yan, Xiang Wang, Rongjuan Pei, Tao Yan, Yuliang Zhao, and Xinbiao Guo

Carbon nanomaterials with various geometric structures exhibit quite different cytotoxicity in vitro, although this may or may not accurately reflect the comparative toxicity in vivo.

1384

Life Cycle Benefits of Using Nanotechnology To Stabilize Platinum-Group Metal Particles in Automotive Catalysts

Shannon M. Lloyd, Lester B. Lave, and H. Scott Matthews

Life-cycle savings are estimated from using nanotechnology to enable precise control over the shape, size, and position of platinum-group metal in automotive catalysts.

Supporting information is available free at <http://pubs.acs.org/est>.