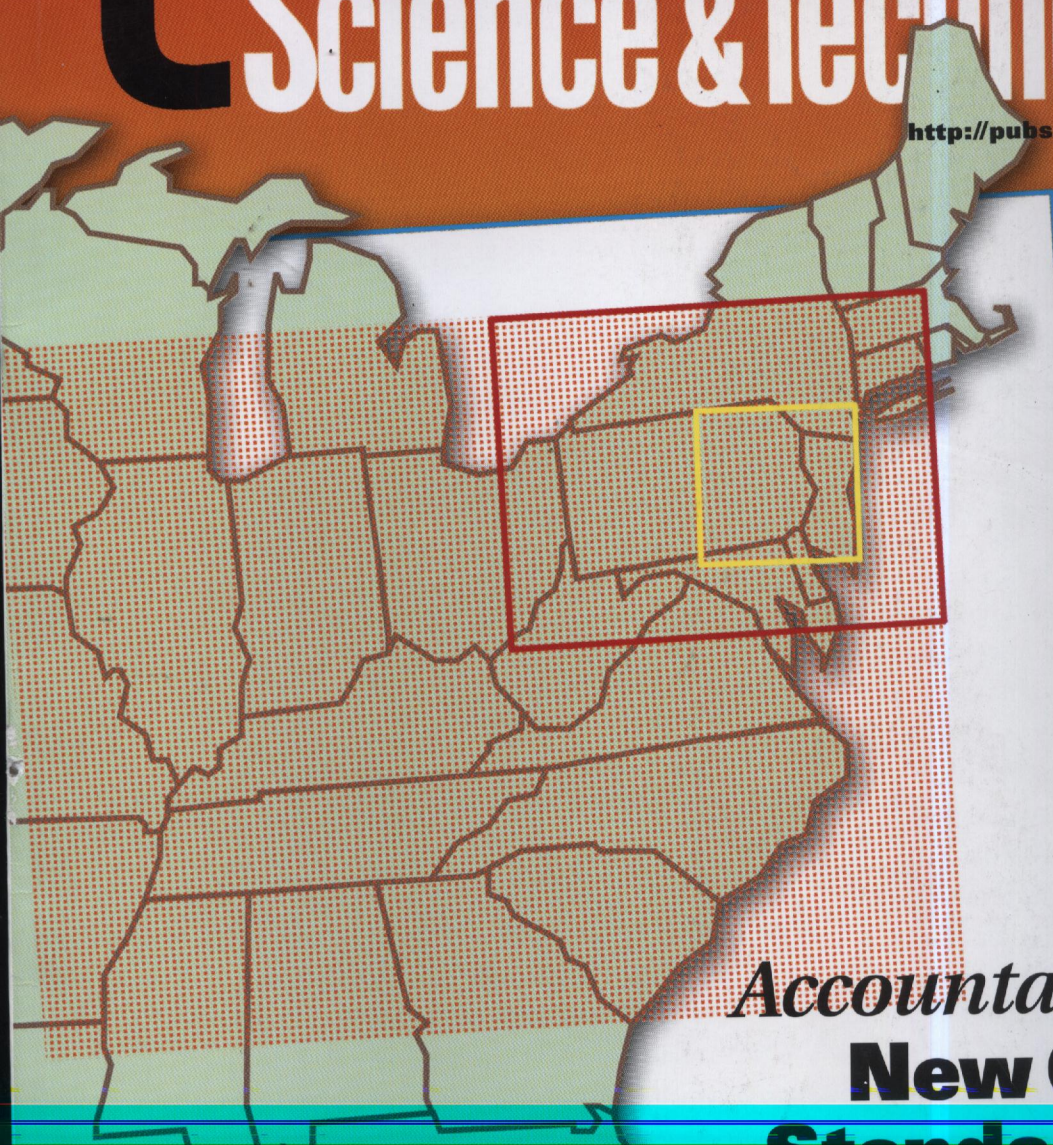


November 1, 2003

# ENVIRONMENTAL Science & Technology

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## Characterization of Natural and Affected Environments

4825

### Toxic Effects of Unresolved Complex Mixtures of Aromatic Hydrocarbons Accumulated by Mussels, *Mytilus edulis*, from Contaminated Field Sites

Peter Donkin, Emma L. Smith, and Steven J. Rowland

Organic chemicals isolated from mussels collected from contaminated field sites are tested for narcotic toxicity; the most toxic chemicals are unresolved complex mixtures of monoaromatic hydrocarbons.

4831

### Identification of the Major Sources Contributing to PM<sub>2.5</sub> Observed in Toronto

Patrick K. H. Lee, Jeffrey R. Brook, Ewa Dabek-Zlotorzynska, and Scott A. Mabury

PM<sub>2.5</sub> source apportionment using 32 species provides a more realistic coal combustion contribution and an alternative approach for estimating the amount of secondary organics.

■ 4841

### Investigation of NH<sub>3</sub> Emissions from New Technology Vehicles as a Function of Vehicle Operating Conditions

Tao Huai, Thomas D. Durbin, J. Wayne Miller, John T. Pisano, Claudia G. Sauer, Sam H. Rhee, and Joseph M. Norbeck

For this study, NH<sub>3</sub> emissions were measured from new technology vehicles, analyzed, and compared with different vehicle operating conditions.

4848

### The Role of Sea Ice in the Fate of Contaminants in the Arctic Ocean: Plutonium Atom Ratios in the Fram Strait

Pere Masqué, J. Kirk Cochran, Dierk Hebbeln, David J. Hirschberg, Dirk Dethleff, and Amelie Winkler

Plutonium atom ratios in the Fram Strait point to the role of sea ice in the long-distance dispersion of contaminants in the Arctic Ocean.

■ 4855

### Distribution of Polycyclic Aromatic Hydrocarbons in the Coastal Region off Macao, China: Assessment of Input Sources and Transport Pathways Using Compositional Analysis

Bixian Mai, Shihua Qi, Eddy Y. Zeng, Qingshu Yang, Gan Zhang, Jiamo Fu, Guoying Sheng, Pingan Peng, and Zhishi Wang

The sources and transport pathways of polycyclic aromatic hydrocarbons present in the coastal region off Macao, China, are assessed using the approach of compositional analysis.

4871

### N-Nitrosodimethylamine Formation by Free-Chlorine-Enhanced Nitrosation of Dimethylamine

Junghoon Choi and Richard L. Valentine

At least two fundamental NDMA formation mechanisms involving DMA and chlorine-based disinfectants, a monochloroamine-UDMH pathway and an HOCl-enhanced nitrosation pathway, are proposed.

4877

### Effect of Dissolved Natural Organic Matter on the Kinetics of Ferrous Iron Oxygenation in Seawater

Andrew L. Rose and T. David Waite

Depending on the origin of the organic matter, terrigenous NOM may accelerate, retard, or minimally affect the rate of Fe(II) oxidation in seawater.

4887

### Volatilization of Weathered Chiral and Achiral Chlordane Residues from Soil

Brian D. Eitzer, William Iannucci-Berger, and MaryJane Incorvia Mattina

Analysis of chlordane in ambient background air and above a contaminated plot indicates that chlordane residues continue to volatilize from soil long after contamination has occurred.

■ 4894

### Effect of Salinity on the Photolysis of Chrysene Adsorbed to a Smectite Clay

Li Kong and John L. Ferry

Chrysene photooxidation decreases as a function of salinity, with the rate of chrysene loss governed by the solution salinity and the extent of surface coverage.

4901

### Soluble Sunscreens Fully Protect *E. coli* from Disinfection by Electrohydraulic Discharges

W.-K. Ching, A. J. Colussi, and M. R. Hoffmann

High-intensity UV emission is the dominant, if not the exclusive, agent in *E. coli* disinfection by the EHD process.

4905

### Colloid-Facilitated Cs Transport through Water-Saturated Hanford Sediment and Ottawa Sand

Jie Zhuang, Markus Flury, and Yan Jin

This study examines the potential of Hanford colloids in facilitating Cs transport through water-saturated Hanford sediment and Ottawa sand.

4912

### Bonding of ppb Levels of Methyl Mercury to Reduced Sulfur Groups in Soil Organic Matter

Torbjörn Karlsson and Ulf Skjällberg

The bonding of methyl mercury to thiol groups in dissolved and solid-phase natural organic matter determines its speciation in soil.



4925

### Post-Depositional Behavior of Cu in a Metal-Mining Polishing Pond (East Lake, Canada)

Alan J. Martin, John L. Jambor, Tom F. Pedersen, and John Crusius

Organic-rich sediments in a metal-mining polishing pond serve as an effective sink for dissolved Cu via the formation of authigenic covellite (CuS).

## Environmental Modeling

■ 4934

### Expanding the Applicability of Multimedia Fate Models to Polar Organic Chemicals

Knut Breivik and Frank Wania

Environmental fate models become more widely applicable and more accurate when polyparameter linear free energy relationships are used to describe phase partitioning.

■ 4944

### Effects of Daily Precipitation and Evapotranspiration Patterns on Flow and VOC Transport to Groundwater along a Watershed Flow Path

Richard L. Johnson, R. Brad Thoms, and John S. Zogorski

Subsurface VOC transport is modeled in two dimensions along a saturated/unsaturated flow path, and the impact of actual daily precipitation and evapotranspiration is examined.

4955

### Applicability and Limitation of QSARs for the Toxicity of Electrophilic Chemicals

Angela Harder, Beate I. Escher, and René P. Schwarzenbach

Linear correlation models based on information obtained from bacterial bioanalytical assays are better predictors of reactive toxicity of electrophiles than QSARs based on physicochemical parameters.

## Environmental Measurements Methods

■ 4962

### Evaluation of Bioanalytical Assays for Toxicity Assessment and Mode of Toxic Action Classification of Reactive Chemicals

Angela Harder, Beate I. Escher, Paolo Landini, Nicole B. Tobler, and René P. Schwarzenbach

The bacteria-based bioanalytical assays allowed the discrimination between reactive chemicals exhibiting glutathione depletion-related toxicity, reactive chemicals causing DNA damage, and unspecifically reactive chemicals.

4971

On-Road Measurement of Automotive Particle Emissions by

■ 4982

### NMR-Based Metabolomics: A Powerful Approach for Characterizing the Effects of Environmental Stressors on Organism Health

Mark R. Viant, Eric S. Rosenblum, and Ronald S. Tjeerdema

The application of NMR-based metabolomics for diagnosing withering syndrome in red abalone (*Haliotis rufescens*) by determining metabolic biomarker profiles characteristic of the diseased condition is described.

4990

### Improvement in the Determination of $^{238}\text{U}$ , $^{228-234}\text{Th}$ , $^{226-228}\text{Ra}$ , $^{210}\text{Pb}$ , and $^7\text{Be}$ by $\gamma$ Spectrometry on Evaporated Fresh Water Samples

C. Cazala, J. L. Reyss, J. L. Decossas, and A. Royer

Evaporation of freshwater samples followed by  $\gamma$  spectrometry provides a simple method for the survey of several radionuclides in natural waters.

■ 4994

### Avoiding Hydrolysis of Fuel Ether Oxygenates during Static Headspace Analysis

Zhixun Lin, John T. Wilson, and Dennis D. Fine

Fuel ether hydrolysis resulting from heated static headspace analysis is avoided by using trisodium phosphate for preservation or by neutralizing acid-preserved samples before analysis.

## Remediation and Control Technologies

5001

### Decontamination of Polyaromatic Hydrocarbons from Soil by Steam Stripping: Mathematical Modeling of the Mass Transfer and Energy Requirement

Oliver Braass, Christian Tiffert, Joachim Höhne, Xing Luo, and Bernd Niemeyer

Simulation predicts the lowest energy consumption with good cleaning performance at a steam mass flow of 20 kg/h and a suspension of 4 kg/h.

5008

### Rhizosphere Characteristics of the Arsenic Hyperaccumulator *Pteris vittata* L. and Monitoring of Phytoremoval Efficiency

Walter J. Fitz, Walter W. Wenzel, Hao Zhang, Johanna Nurmi, Kamil Stipek, Zuzana Fischerova, Peter Schweiger, Gunda Kollensperger, Lena Q. Ma, and Gerhard Stingeder

A pioneering study of *Pteris vittata* rhizosphere demonstrates that bioavailable contaminant stripping of arsenic can be monitored by using diffusive gradients in thin films.

5015



5027

### Microbial and Nutrient Investigations into the Use of in Situ Layers for Treatment of Tailings Effluent

Andrea H. M. Hulshof, David W. Blowes, Carol J. Ptacek, and W. Douglas Gould

A novel method of geochemically engineering mill tailings leads to improvements in water quality.

5034

### Oil Removal from Water by Sorption on Hydrophobic Cotton Fibers. 2. Study of Sorption Properties in Dynamic Mode

Gerald Deschamps, Herve Caruel, Marie-Elisabeth Borredon, Claire Albasi, Jean-Pierre Riba, Christophe Bonnin, and Christian Vignoles

Hydrophobic cotton fibers act as a sorbent with oil in water emulsions; the sorption can be modeled as a piston-through system.

■ 5040

### Field Evaluation of the Solvent Extraction Residual Biotreatment Technology

Susan C. Mravik, Randall K. Sillan, A. Lynn Wood, and Guy W. Sewell

A treatment train approach to site remediation shows enhanced reductive dechlorination of PCE following source area treatment by cosolvent flushing with ethanol at a former dry cleaner site.

5050

### Immobilization Mechanisms of Arsenate in Iron Hydroxide Sludge Stabilized with Cement

Chuanyong Jing, George P. Korfiatis, and Xiaoguang Meng

Arsenate formed bidentate complexes on the iron hydroxide sludge and immobilization with cement converted the adsorbed As(V) to calcium arsenate precipitate.

5057

### Chemical and Biological Regeneration of HDTMA-Modified Montmorillonite after Sorption with Phenol

Liuyan Yang, Zhi Zhou, Lin Xiao, and Xiaorong Wang

Yeast *Pityrosporum* sp. can significantly improve the sorption capacity of regenerated phenol-laden HDTMA-modified montmorillonite over the chemical regeneration method.

5062

### Mechanisms of Arsenate Adsorption by Highly-Ordered Nano-Structured Silicate Media Impregnated with Metal Oxides

Min Jang, Eun Woo Shin, Jae Kwang Park, and Sang Il Choi

Studies of the physicochemical characteristics and surface complexation modeling of highly dispersed metal-oxide-impregnated SBA-15 are conducted to understand the specific arsenate adsorption behaviors.

## Sustainability Engineering and Green Chemistry

■ 5071

### Short- and Long-Term Releases of Fluorocarbons from Disposal of Polyurethane Foam Waste

Peter Kjeldsen and Charlotte Scheutz

A prediction of the future release of fluorocarbons from insulation foam waste is given based on release experiments and a new double compartment diffusion model.

## Additions and Corrections

5080

### Assessment of the Risk of Solar Ultraviolet Radiation to Amphibians. II. In Situ Characterization of Exposure in Amphibian Habitats.

Gregory S. Peterson, Lucinda B. Johnson, Richard P. Axler, and Stephen A. Diamond

■ Supporting Information is available free of charge via the Internet at <http://pubs.acs.org>.