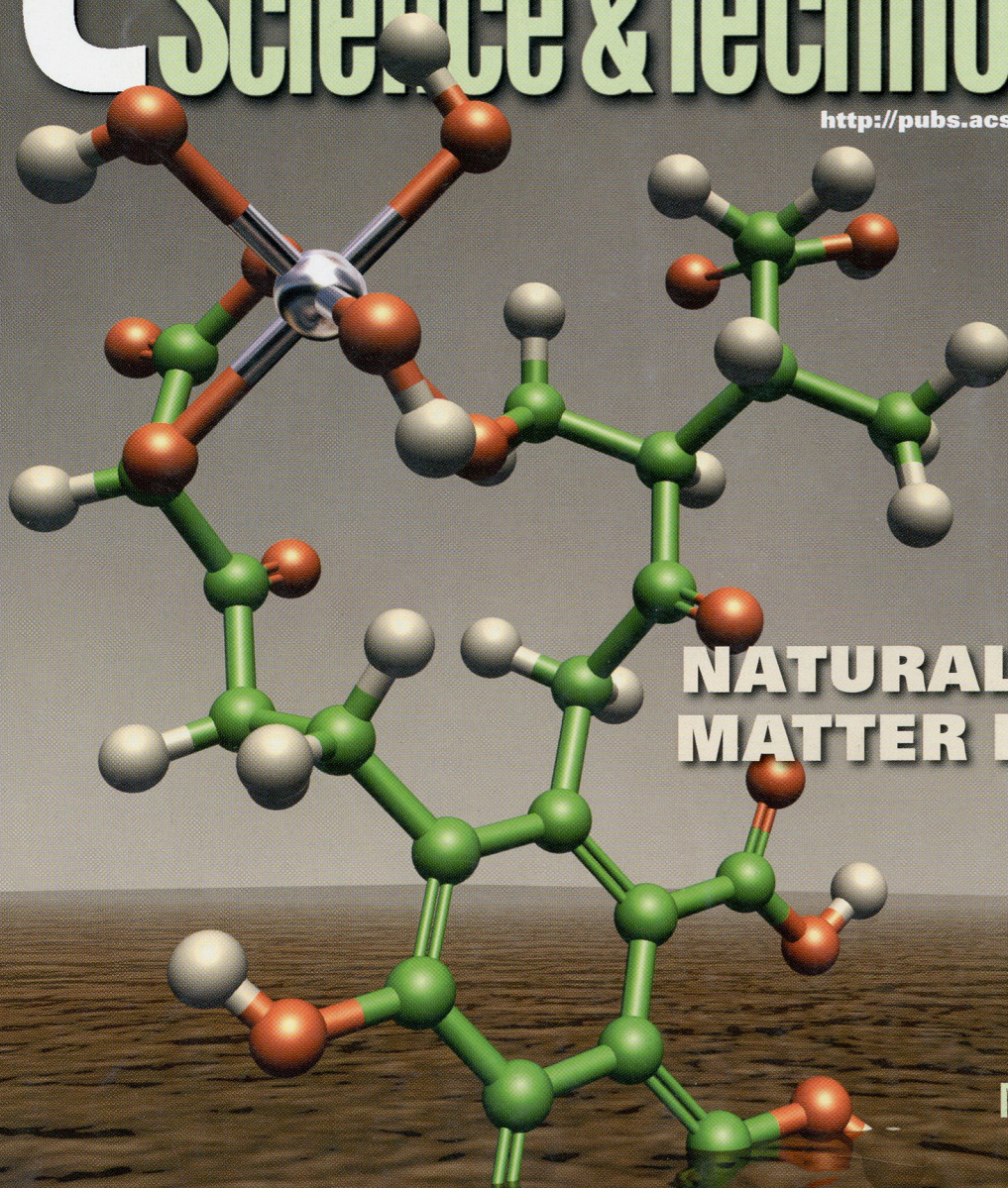


December 15, 2006

# ENVIRONMENTAL Science & Technology

<http://pubs.acs.org/est>



## NATURAL ORGANIC MATTER MODELING

PCBs and PBDEs  
in Indoor Air

New Nitrosamines  
in Drinking Water

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CHEMICAL SOCIETY



## News and Features

### NEWS

#### 7452 PBDEs and PCBs in computers, cars, and homes

Emissions from older computers can be more toxic than previously thought.

#### 7453 Nitrogen isotopes reveal degradation

A new technique gives superior information about the breakdown of nitrogen-containing pollutants.

#### 7453-7457 News Briefs

Sequestering science • Mice and disease • U.K. politicians embrace climate-change concerns • French joint venture • The trade-offs of eating fish • Great Lakes ship spills

#### 7454 More nitrosamines in drinking water

Two disinfection byproducts, considered to be potential carcinogens, have been detected in drinking water for the first time.

#### 7455 Chemicals management getting tougher?

The effects of Canada's assessment of chemicals and the new European chemicals law are likely to reverberate through the international market.

#### 7456 CDC finds perchlorate-iodide connection

Women with low iodide levels may be at risk for thyroid trouble when exposed to relatively low amounts of perchlorate.

#### 7457 California law sends signal to coal power

A new CO<sub>2</sub> emission standard is likely to make utilities think twice about building conventional coal-fired power plants in western states.

#### 7458 A passion for something new

Pedro Alvarez will join *ES&T* as an associate editor in January.

#### 7467 2006 News and Features Subject and Author Index

### FEATURE

#### 7459 Modeling Metal-Particle Interactions with an Emphasis on Natural Organic Matter

Patricia Merdy, Sandrine Huclier, and Luuk K. Koopal



The use of models to understand the speciation and distribution of metals in the environment is essential for predicting metal transport and bioavailability. The authors discuss primary metal-particle interaction models and point out their limitations. They also examine how predictions from models compare with field measurements.

## Research

### SPECIAL SECTION: NATURAL ORGANIC MATTER MODELING

Natural organic matter (NOM) plays a key role in rivers, lakes, groundwater, seawater, and soils for the binding of cations and for interactions with mineral surfaces. The complexity of the heterogeneous properties of NOM is a challenge to model development. The four manuscripts in this special section present some recent model developments that will improve our understanding of these complex interactions and provide a framework for application to natural systems. *ES&T* Associate Editor Laura Sigg served as the coordinator for this section.

#### 7473 Critical Review

##### Modeling the Interactions between Humics, Ions, and Mineral Surfaces

Willem H. van Riemsdijk, Luuk K. Koopal, David G. Kinniburgh, Marc F. Benedetti, and Liping Weng

Various aspects are discussed regarding the modeling of ions, humics, and mineral interactions with the NICA model for ion binding to humics and the LCD model for humic-mineral interactions.

#### 7481

##### Lanthanide-Humic Substances Complexation. II. Calibration of Humic Ion-Binding Model V

Jeroen E. Sonke

Humic Ion-Binding Model V is calibrated with new experimental data on rare-earth-element, yttrium, and scandium complexation by fulvic and humic acids.

#### 7488

##### Modeling Iron Binding to Organic Matter

Tiphaine Weber, Thierry Allard, Edward Tipping, and Marc F. Benedetti

During the interaction of iron with organic matter, Fe(III) is partly reduced to Fe(II); Fe<sup>3+</sup> and Fe(OH)<sup>2+</sup> are complexed by carboxylic sites, not Fe(II).

#### 7494

##### Adsorption of Humic Substances on Goethite: Comparison between Humic Acids and Fulvic Acids

Liping Weng, Willem H. Van Riemsdijk, Luuk K. Koopal, and Tjisse Hiemstra

Strength, salt dependency, and pH dependency in adsorption of humic acids and fulvic acids to goethite are compared; the relationship between proton co-adsorption and pH dependency is discussed.

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

**Cover:** Ken Eward of BioGrafx designed the cover image, which shows Pb<sup>2+</sup> interacting with natural organic matter.

**Online news:** Read news first at <http://pubs.acs.org/estnews>.



## CRITICAL REVIEWS

7501

### **Applications, Considerations, and Sources of Uncertainty When Using Stable Isotope Analysis in Ecotoxicology**

Timothy D. Jardine, Karen A. Kidd, and Aaron T. Fisk

The current use of stable isotopes in ecotoxicology studies is reviewed, and recommendations are provided for dealing with sources of uncertainty in such studies.

■ 7512

### **Designing Hypolimnetic Aeration and Oxygenation Systems—A Review**

Vickie L. Singleton and John C. Little

Types of aeration/oxygenation devices are discussed, select installations are summarized, and published design methods (validated with data collected from full-scale field installations) are reviewed.

## CHARACTERIZATION OF NATURAL AND AFFECTED ENVIRONMENTS

■ 7521

### **Evolution of the Snow Area Index of the Subarctic Snowpack in Central Alaska over a Whole Season. Consequences for the Air to Snow Transfer of Pollutants**

A.-S. Taillandier, F. Domine, W. R. Simpson, M. Sturm, T. A. Douglas, and K. Severin

Snow area index is defined as the surface area available in snowpack for gas adsorption and is used to calculate pollutant storage in snowpack.

■ 7528

### **Polybrominated Diphenyl Ethers in the Sediments of the Great Lakes. 4. Influencing Factors, Trends, and Implications**

An Li, Karl J. Rockne, Neil Sturchio, Wenlu Song, Justin C. Ford, Dave R. Buckley, and William J. Mills

A comprehensive data set is analyzed to examine the spatial and temporal distributions, urban influence, air deposition, emission history, and long-range transport of PBDEs.

7535

### **Concentration and Dry Deposition of Mercury Species in Arid South Central New Mexico (2001–2002)**

Colleen A. Caldwell, Philip Swartzendruber, and Eric Prestbo

Concentration and dry deposition of mercury (reactive gaseous, particulate-bound, and elemental) are characterized via a KCl denuder speciation train and an ion-exchange membrane.

7541

### **Survey of Polybrominated Diphenyl Ether Levels in Spanish Commercial Foodstuffs**

B. Gómara, L. Herrero, and M. J. González

Concentrations are reported of 15 PBDEs (tri- to deca-BDEs) in Spanish commercial foodstuffs, and an estimate of the daily intake is given.

■ 7548

### **Phosphorus Limits Phytoplankton Growth on the Louisiana Shelf During the Period of Hypoxia Formation**

Jason B. Sylvan, Quay Dortch, David M. Nelson, Alisa F. Maier Brown, Wendy Morrison, and James W. Ammerman

Spring phytoplankton production on the Louisiana coast is phosphorus-limited from Mississippi River nitrogen loading; this suggests that coastal hypoxia control should include both nitrogen and phosphorus.

■ 7554

### **Platinum Group Elements in Airborne Particles in Mexico City**

Sebastien Rauch, Bernhard Peucker-Ehrenbrink, Luisa T. Molina, Mario J. Molina, Rafael Ramos, and Harold F. Hemond

Platinum, palladium, and rhodium concentrations in Mexico City PM<sub>10</sub> airborne particles have increased since the introduction of automobile exhaust catalysis.

■ 7561

### **Experimental Validation of a Geographical Information Systems-Based Procedure for Predicting Pesticide Exposure in Surface Water**

Sara Bonzini, Roberto Verro, Stefan Otto, Luca Lazzaro, Antonio Finizio, Giuseppe Zanin, and Marco Vighi

A GIS-based procedure for predicting pesticide concentration in surface water is experimentally validated on a pilot basin and critically discussed.

■ 7570

### **Endosulfan and $\gamma$ -HCH in the Arctic: An Assessment of Surface Seawater Concentrations and Air–Sea Exchange**

Jan Weber, Crispin J. Halsall, Derek C. G. Muir, Camilla Teixeira, Deborah A. Burniston, William M. J. Strachan, Hayley Hung, Neil Mackay, David Arnold, and Henrik Kylin

Seawater concentrations of two current-use pesticides are reported for the Arctic Ocean, and their air-to-sea transfer is assessed with a fugacity approach.

7577

### **Perfluorinated Chemicals in the Arctic Atmosphere**

M. Shoeib, T. Harner, and P. Vlahos

New information is presented on the presence and transport of perfluorinated chemicals from air samples collected over the North Atlantic Ocean and Canadian Archipelago.

7584

### **Causes of Variability in Concentrations of Polychlorinated Biphenyls and Polybrominated Diphenyl Ethers in Indoor Air**

Sadegh Hazrati and Stuart Harrad

Contamination of buildings with PCBs and cars with PBDEs varies with microenvironment age; removing an old PC reduced PBDE contamination in one office by 75%.

■ 7590

### **Rapid Reduction and Reemission of Mercury Deposited into Snowpacks during Atmospheric Mercury Depletion Events at Churchill, Manitoba, Canada**

Jane L. Kirk, Vincent L. St. Louis, and Martin J. Sharp

Rapid reduction and reemission of mercury deposited during atmospheric mercury depletion events result in low *net* springtime loadings of mercury to western Hudson Bay.

■ 7597

### **Superfund Dredging Restoration Results in Widespread Regional Reduction in Cadmium in Blue Crabs**

Jeffrey S. Levinton, Sharon T. Pochron, and Michael W. Kane

The cleanup of Foundry Cove, a cadmium-polluted Superfund site in the Hudson River, results in a widespread regional reduction of cadmium in the blue crab.

■ 7602

### **New Combination of EXAFS Spectroscopy and Density Fractionation for the Speciation of Chromium within an Andosol**

Emmanuel Døelsch, Isabelle Basile-Døelsch, Jérôme Rose, Armand Masion, Daniel Borschneck, Jean-Louis Hazemann, Hervé Saint Macary, and Jean-Yves Bottero



The speciation of Cr within a soil by an approach based on physical soil fractionation before EXAFS speciation analyses is reported.

■ 7609

**Characterizing the Redox Status in Three Different Forested Wetlands with Geochemical Data**

Christine Alewell, Sonja Paul, Gunnar Lischeid, Kirsten Küsel, and Matthias Gehre

Redox processes in forested wetlands (in Germany) demonstrate a high temporal and spatial heterogeneity; this indicates that the sequential reduction chain is not a suitable modeling concept.

7616

**Tracking Anthropogenic Inputs Using Caffeine, Indicator Bacteria, and Nutrients in Rural Freshwater and Urban Marine Systems**

Kelly A. Peeler, Stephen P. Opsahl, and Jeffrey P. Chanton

Caffeine, nutrients, and indicator bacteria were used to distinguish human versus nonhuman sources of surface-water contamination in rural freshwater and urban marine environments.

7623

**Hurricane Katrina's Impact on New Orleans Soils Treated with Low Lead Mississippi River Alluvium**

Howard W. Mielke, Eric T. Powell, Christopher R. Gonzales, and Paul W. Mielke, Jr.

Even after New Orleans was flooded, Mississippi River alluvial soil spread on contaminated properties remains stable and continues to provide lead-safe outdoor environments for children.

■ 7629

**Factors Influencing the National Distribution of Polycyclic Aromatic Hydrocarbons and Polychlorinated Biphenyls in British Soils**

Elizabeth Heywood, Julian Wright, Claire L. Wienburg, Helaina I. J. Black, Sara M. Long, Dan Osborn, and David J. Spurgeon

Measurement of POP concentrations in soils illustrates the importance of source intensity for PAHs and of source intensity, long-range processes, and soil organic content for PCBs.

■ 7636

**Characterization of New Nitrosamines in Drinking Water Using Liquid Chromatography Tandem Mass Spectrometry**

Yuan-Yuan Zhao, Jessica Boyd, Steve E. Hrudey, and Xing-Fang Li

Two new disinfection byproducts NDPhA and NPip, along with NDMA and NPyr, are identified in a drinking-water distribution system by liquid chromatography/tandem mass spectrometry.

■ 7642

**Perfluorooctanesulfonate and Related Fluorochemicals in Albatrosses, Elephant Seals, Penguins, and Polar Skuas from the Southern Ocean**

Lin Tao, Kurunthachalam Kannan, Natsuko Kajiwara, Mônica M. Costa, Gilberto Fillmann, Shin Takahashi, and Shinsuke Tanabe

Southern Ocean albatrosses and elephant seals contain 10–100-fold lower levels of perfluorochemicals than Arctic birds and seals.

7649

**Enantioselective Formation of Methyl Sulfone Metabolites of 2,2',3,3',4,6'-Hexachlorobiphenyl in Rat**

Karin Norström, Johan Eriksson, Johanna Haglund, Virginia Silvani, and Åke Bergman

Methyl sulfone metabolites of CB-132 are formed through an enantioselective process in the rat.

■ 7656

**Tropospheric Phosphine and Its Sources in Coastal Antarctica**

Renbin Zhu, Deming Kong, Liguang Sun, Jinju Geng, Xiaorong Wang, and Dietmar Glindemann

The exploration of unexpectedly high atmospheric phosphine concentrations in coastal Antarctica is reported and is linked to soils of sea-animal colonies as emission sources.

## ENVIRONMENTAL PROCESSES

■ 7662

**Kinetics of Contaminant Desorption from Soil: Comparison of Model Formulations Using the Akaike Information Criterion**

Christopher M. Saffron, Jeong-Hun Park, Bruce E. Dale, and Thomas C. Voice

The Akaike information criterion is used to select among nine mathematical models for the description of desorption rates for atrazine- and naphthalene-contaminated soils.

7668

**Oxidation of Aromatic and Aliphatic Hydrocarbons by OH Radicals Photochemically Generated from H<sub>2</sub>O<sub>2</sub> in Ice**

Jindřiška Dolinová, Radovan Růžička, Romana Kurková, Jana Klánová, and Petr Klán

The study of oxidation of aromatic and saturated aliphatic hydrocarbons by the hydroxyl radicals, photochemically produced from hydrogen peroxide in ice, is described.

■ 7675

**Effects of Trace Element Concentration on Enzyme Controlled Stable Isotope Fractionation during Aerobic Biodegradation of Toluene**

Silvia A. Mancini, Sarah K. Hirschorn, Martin Elsner, Georges Lacrampe-Couloume, Brent E. Sleep, Elizabeth A. Edwards, and Barbara Sherwood Lollar

Smaller isotopic fractionation during toluene biodegradation is observed for *Pseudomonas putida* mt-2 grown under high versus low iron concentrations; this is probably due to a change in enzyme kinetics.

7682

**Heterogeneous Reactions of Methylglyoxal in Acidic Media: Implications for Secondary Organic Aerosol Formation**

Jun Zhao, Nicholas P. Levitt, Renyi Zhang, and Jianmin Chen

Hydration and polymerization of methylglyoxal contribute to secondary organic aerosol formation; these are dependent on hygroscopicity, rather than acidity of the aerosols.

■ 7688

**Influence of Surface Potential on Aggregation and Transport of Titania Nanoparticles**

Katherine A. Dunphy Guzman, Michael P. Finnegan, and Jillian F. Banfield

Aggregation and transport of titania nanoparticles under varying pH conditions are studied with micromodels, and the ability of theory to predict nanoparticle interactions is evaluated.

■ 7694

**Sorption of Trichloroethylene in Hydrophobic Micropores of Dealuminated Y Zeolites and Natural Minerals**

Hefa Cheng and Martin Reinhard

■ Supporting information is available free at <http://pubs.acs.org/est>.  
▶ This issue contains a news story about this research.



Thermodynamic considerations and laboratory experiments suggest that trichloroethylene adsorbs into hydrophobic micropores of minerals by displacing loosely bound water; this process is driven primarily by enthalpic contributions.

■ 7702

### Microscale Investigations of Ni Uptake by Cement Using a Combination of Scanning Electron Microscopy and Synchrotron-Based Techniques

M. Vespa, R. Dähn, E. Gallucci, D. Grolimund, E. Wieland, and A. M. Scheidegger

In situ microscale investigations of Ni uptake by cement reveal a highly heterogeneous distribution of Ni and a direct association to Ca-Si-containing cement phases.

■ 7710

### Using Nitrogen Isotope Fractionation To Assess Abiotic Reduction of Nitroaromatic Compounds

Akané Hartenbach, Thomas B. Hofstetter, Michael Berg, Jakov Bolotin, and René P. Schwarzenbach

Substantial nitrogen isotope fractionation of four nitroaromatic compounds suggests that apparent kinetic isotope effects can be used to assess the fate of nitrogen-containing contaminants in subsurface environments.

■ 7717

### Quantum Chemical Calculations of Sulfate Adsorption at the Al- and Fe-(Hydr)oxide-H<sub>2</sub>O Interface—Estimation of Gibbs Free Energies

Kristian W. Paul, James D. Kubicki, and Donald L. Sparks

The Gibbs free energy of sulfate adsorption on variably charged Al- and Fe-(hydr)oxides is estimated with molecular orbital/density functional theory cluster calculations.

■ 7725

### Excess Colloid Retention in Porous Media as a Function of Colloid Size, Fluid Velocity, and Grain Angularity

Meiping Tong and William P. Johnson

Retention in flow stagnation zones in porous media in the presence of an energy barrier is an important removal mechanism for a wide range of colloid sizes.

■ 7732

### Using Nitrogen and Carbon Dioxide Molecules To Probe Arsenic(V) Bioaccessibility in Soils

Konstantinos C. Makris, Dibyendu Sarkar, Rupali Datta, Peter I. Ravikovitch, and Alexander V. Neimark

Soil As bioaccessibility is adequately described with a simple empirical model consisting of representative chemical (TOC) and physical (specific surface area) soil properties.

7739

### Model Bacterial Extracellular Polysaccharide Adsorption onto Silica and Alumina: Quartz Crystal Microbalance with Dissipation Monitoring of Dextran Adsorption

Kideok D. Kwon, Hans Green, Patrik Bjöörn, and James D. Kubicki

A quartz crystal microbalance with dispersion is used to study adsorption of model bacterial polysaccharides onto silica and alumina; the ability to measure kinetics and nanoscale structure is demonstrated.

7745

### XAS and XMCD Evidence for Species-Dependent Partitioning of Arsenic during Microbial Reduction of Ferrihydrite to Magnetite

V. S. Coker, A. G. Gault, C. I. Pearce, G. van der Laan, N. D. Telling, J. M. Charnock, D. A. Polya, and J. R. Lloyd

Synchrotron techniques (XAS and XMCD) are used to study the incorporation of arsenate into magnetite during the dissimilatory microbial reduction of ferrihydrite.

7751

### Quantifying the Availability of Clay Surfaces in Soils for Adsorption of Nitrocyanoobenzene and Diuron

Simone M. Charles, Hui Li, Brian J. Teppen, and Stephen A. Boyd

The availability of clay minerals in soil for adsorption of organic compounds is experimentally quantified and is linked to mineral surface coverage by soil organic matter.

■ 7757

### Effect of Natural Organic Substances on the Surface and Adsorptive Properties of Environmental Black Carbon (Char): Attenuation of Surface Activity by Humic and Fulvic Acids

Joseph J. Pignatello, Seokjoon Kwon, and Yufeung Lu

Loading of humic substances greatly reduces the N<sub>2</sub> BET surface area and presents competition for adsorption of organic compounds at external surfaces.

■ 7764

### Methylmercury in Freshwater Fish Linked to Atmospheric Mercury Deposition

Chad R. Hammerschmidt and William F. Fitzgerald

In the U.S., statewide average concentrations of methylmercury in wild populations of largemouth bass vary positively with wet atmospheric fluxes of mercury among many states.

■ 7771

### Factors Affecting the Efficiency of Carbon Monoxide Photoproduction in the St. Lawrence Estuarine System (Canada)

Yong Zhang, Huixiang Xie, and Guohua Chen

Water temperature and origin and light history of chromophoric dissolved organic matter affect the efficiency of carbon monoxide photoproduction in marine waters.

■ 7778

### Assessment of Isotope Exchange Methodology To Determine the Sorption Coefficient and Isotopically Exchangeable Concentration of Selenium in Soils and Sediments

Richard N. Collins, Ngoc D. Tran, Estelle Bakkaus, Laure Avoscan, and Barbara Gouget

The redox states of selenium, and their isotope self-exchange reactions, need to be identified when sorption coefficients and *E* values are measured in soils and sediments.

■ 7784

### Arsenate Sorption on Lithium/Aluminum Layered Double Hydroxide Intercalated by Chloride and on Gibbsite: Sorption Isotherms, Envelopes, and Spectroscopic Studies

Yu Ting Liu, Ming Kuang Wang, Tsan Yao Chen, Po Neng Chiang, Pan Ming Huang, and Jhy Fu Lee

The sorption capacity of Li/Al LDH-Cl for arsenate is shown to be superior to that of Al(OH)<sub>3</sub>, because it transforms the inert Al(OH)<sub>3</sub> surface into active sorption sites.

■ 7790

### Wavelength Dependence of Fe(II) Photoformation in the Water-Soluble Fraction of Aerosols Collected in Okinawa, Japan

Kouichirou Okada, Yukiko Kuroki, Yoshihide Nakama, Takemitsu Arakaki, and Akira Tanahara

Fe(II) photoformation in solutions of the water-soluble fraction of aerosols collected in Okinawa, Japan, shows wavelength dependency.

7796

### Novel Aerobic Perchloroethylene Degradation by the White-Rot Fungus *Trametes versicolor*



Ernest Marco-Urrea, Xavier Gabarrell, Montserrat Sarrà, Gloria Caminal, Teresa Vicent, and C. Adinarayana Reddy

The fungus *T. versicolor* can aerobically degrade perchloroethylene to trichloroacetic acid, and inhibitory experiments suggest that cytochrome P-450 is involved in the degradation.

## ENVIRONMENTAL MODELING

### ■ 7803

#### Source Apportionment of Molecular Markers and Organic Aerosol. 1. Polycyclic Aromatic Hydrocarbons and Methodology for Data Visualization

Allen L. Robinson, R. Subramanian, Neil M. Donahue, Anna Bernardo-Bricker, and Wolfgang F. Rogge

Mixing of emissions from different sources and photochemical aging on PAH concentrations is examined with a data visualization technique and chemical mass balance monitoring.

### ■ 7811

#### Source Apportionment of Molecular Markers and Organic Aerosol. 2. Biomass Smoke

Allen L. Robinson, R. Subramanian, Neil M. Donahue, Anna Bernardo-Bricker, and Wolfgang F. Rogge

Variability in source profiles and ambient biomass smoke marker concentrations creates uncertainty in chemical mass balance results.

### ■ 7820

#### Source Apportionment of Molecular Markers and Organic Aerosol. 3. Food Cooking Emissions

Allen L. Robinson, R. Subramanian, Neil M. Donahue, Anna Bernardo-Bricker, and Wolfgang F. Rogge

Ambient concentrations of cooking markers are strongly correlated, but inconsistencies between ambient data and source profiles create significant uncertainty in chemical mass balance results.

### ■ 7828

#### On-Road Heavy-Duty Diesel Particulate Matter Emissions Modeled Using Chassis Dynamometer Data

Tom Kear and D. A. Niemeier

Operational correction factors are estimated to adjust on-road heavy-duty diesel particle emission rates to reflect real-world driving conditions that are not captured with current driving cycles.

### ■ 7834

#### Vulnerability of Shallow Groundwater and Drinking-Water Wells to Nitrate in the United States

Bernard T. Nolan and Kerie J. Hitt

New national models predict nitrate concentration in shallow groundwater and in drinking-water wells.

### ■ 7841

#### Forecasting Acidification Effects Using a Bayesian Calibration and Uncertainty Propagation Approach

Thorjorn Larssen, Ragnar B. Huseby, Bernard J. Cosby, Gudmund Høst, Tore Høgåsen, and Magne Aldrin

A Bayesian approach is combined with a hydrogeochemical model (MAGIC) to calculate probability distributions for water quality and fish population health in the future with different scenarios of acid deposition.

### ■ 7848

#### Estimating Nutrients and Chlorophyll *a* Relationships in Finnish Lakes

Olli Malve and Song S. Qian

A hierarchical linear model that predicts the response of chlorophyll *a* to variations in lake total phosphorus and total ni-

trogen concentrations is fitted to a large cross-sectional data set from the Finnish Lake Monitoring Network.

## ENVIRONMENTAL MEASUREMENTS METHODS

### ■ 7854

#### Struggle for Quality in Determination of Perfluorinated Contaminants in Environmental and Human Samples

Stefan P. J. van Leeuwen, Anna Kärrman, Bert van Bavel, Jacob de Boer, and Gunilla Lindström

The first worldwide interlaboratory study on perfluorinated compounds shows that the analytical methodologies are not yet fully mastered.

### ■ 7861

#### Measurement of Dissolved H<sub>2</sub>, O<sub>2</sub>, and CO<sub>2</sub> in Groundwater Using Passive Samplers for Gas Chromatographic Analyses

B. P. Spalding and D. B. Watson

A short length of tubing attached to a syringe is adapted for passive sampling of dissolved gases in groundwater; this simplifies field collection and sample handling.

### 7868

#### Cavity Ring-Down Spectroscopy of Ambient NO<sub>2</sub> with Quantification and Elimination of Interferences

James Hargrove, Liming Wang, Karen Muyskens, Mark Muyskens, David Medina, Susan Zaide, and Jingsong Zhang

Ambient measurement of NO<sub>2</sub> by cavity ring-down spectroscopy at 405 nm is examined and corrected for interferences with a NO<sub>2</sub> denuder.

### ■ 7874

#### Characterizing Dissolved and Particulate Phosphorus in Water with <sup>31</sup>P Nuclear Magnetic Resonance Spectroscopy

Barbara J. Cade-Menun, John A. Navaratnam, and Mark R. Walbridge

Dissolved and particulate phosphorus in 4-L river-water samples are characterized by solution <sup>31</sup>P-NMR spectroscopy, and differences between river inlet and floodplain samples are detected.

## REMEDIATION AND CONTROL TECHNOLOGIES

### 7881

#### Treatment of Odorous Sulphur Compounds by Chemical Scrubbing with Hydrogen Peroxide—Stabilisation of the Scrubbing Solution

Isabelle Charron, Annabelle Couvert, Alain Laplanche, Christophe Renner, Lucie Patria, and Benoît Requieme

Several chemical additives for the stabilization of hydrogen peroxide are tested.

### 7886

#### The Fate of Fluorine and Chlorine during Thermal Treatment of Coals

Shaoqing Guo, Jianli Yang, and Zhenyu Liu

Fluorine and chlorine compounds released from coal processing are investigated for their toxicity to plants and animals as well as their contribution to equipment corrosion.

### 7890

#### Collection of Ultrafine Diesel Particulate Matter (DPM) in Cylindrical Single-Stage Wet Electrostatic Precipitators

■ Supporting information is available free at <http://pubs.acs.org/est>.  
▶ This issue contains a news story about this research.



Phirun Saiyasitpanich, Tim C. Keener, Mingming Lu, Soon-Jai Khang, and Douglas E. Evans

A tubular wet electrostatic precipitator has been designed and is successfully evaluated at various operating conditions for the efficient removal of ultrafine PM from diesel exhaust.

■ 7896

**Occurrence of Estrogenic Compounds in and Removal by a Swine Farm Waste Treatment Plant**

Takuma Furuichi, Kurunthachalam Kannan, Kazuyoshi Suzuki, Shuzo Tanaka, John P. Giesy, and Shigeki Masunaga

Concentrations (ng/L) of target estrogenic compounds are determined at each step of the treatment process in a swinery wastewater treatment plant.

■ 7903

**Visible-Light-Induced Photocatalytic Degradation of Azodyes in Aqueous AgI/TiO<sub>2</sub> Dispersion**

Chun Hu, Xuexiang Hu, Liusuo Wang, Jiuhui Qu, and Aimin Wang

A novel visible-light photocatalyst, AgI/TiO<sub>2</sub>, is developed that shows high efficiency for the decomposition of azodyes under visible light.

7908

**Effect of Coagulation on the Size of MF and UF Membrane Foulants**

Kerry J. Howe, Ashish Marwah, Kuang-Ping Chiu, and Samer S. Adham

Coagulation has an impact on the size of constituents in natural waters that foul MF and UF membranes.

7914

**Improved Mechanical Oil Spill Recovery Using an Optimized Geometry for the Skimmer Surface**

Victoria Broje and Arturo A. Keller

Use of a recovery-unit surface pattern tailored to the properties of the oil to be recovered can increase skimmer oil recovery efficiency up to three times.

■ 7919

**Simultaneous Removal of SO<sub>2</sub> and Trace SeO<sub>2</sub> from Flue Gas: Effect of SO<sub>2</sub> on Selenium Capture and Kinetics Study**

Yuzhong Li, Huiling Tong, Yuqun Zhuo, Shujuan Wang, and Xuchang Xu

The simultaneous removal of SO<sub>2</sub> and trace elements by calcium oxide adsorption in the medium temperature range is studied.

■ 7925

**Lead Paint Removal with High-Intensity Light Pulses**

Michael J. Grapperhaus and Raymond B. Schaefer

Measurements of light pulse characteristics, the reflectivity of different paints, experiments on the threshold for paint removal, and a model are presented.

## SUSTAINABILITY ENGINEERING AND GREEN CHEMISTRY

■ 7930

**Structural Aspects of Surfactant Selection for the Design of Vegetable Oil Semi-Synthetic Metalworking Fluids**

Fu Zhao, Andres Clarens, Ashley Murphree, Kim Hayes, and Steven J. Skerlos

The guidelines presented are consistent with general results of micelle solubilization theory; evidence is provided to suggest that common semisynthetic MWF systems can be thought of as swollen micelle systems.

## ECOTOXICOLOGY AND HUMAN ENVIRONMENTAL HEALTH

7938

**Polyaromatic Hydrocarbon and PAH Metabolite Burdens in Oiled Common Guillemots (*Uria aalge*) Stranded on the East Coast of England (2001–2002)**

Gera M. Troisi, Steve Bexton, and Ian Robinson

PAH exposure via ingestion of crude oil during preening results in uptake and tissue contamination; metabolites detected in liver samples are beyond levels expected from food-chain exposure.

7944

**Toxicological Housekeeping Genes: Do They Really Keep the House?**

Augustine Arukwe

Data are presented to show that very few biological justifications exist to refer to anything as a housekeeping gene in real-time PCR assays for toxicological research.

## CORRESPONDENCE AND REBUTTAL

7950

**Comment on "Stereoselective Degradation Kinetics of Theta-Cypermethrin in Rats"**

Wolfgang Bicker, Michael Lämmerhofer, and Wolfgang Lindner

## ADDITIONS AND CORRECTIONS

7952

**Congener-Specific Carbon Isotopic Analysis of Technical PCB and PCN Mixtures Using Two-Dimensional Gas Chromatography–Isotope Ratio Mass Spectrometry**

Yuichi Horii, Kurunthachalam Kannan, Gert Petrick, Toshitaka Gamo, Jerzy Falandysz, and Nobuyoshi Yamashita

7953

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