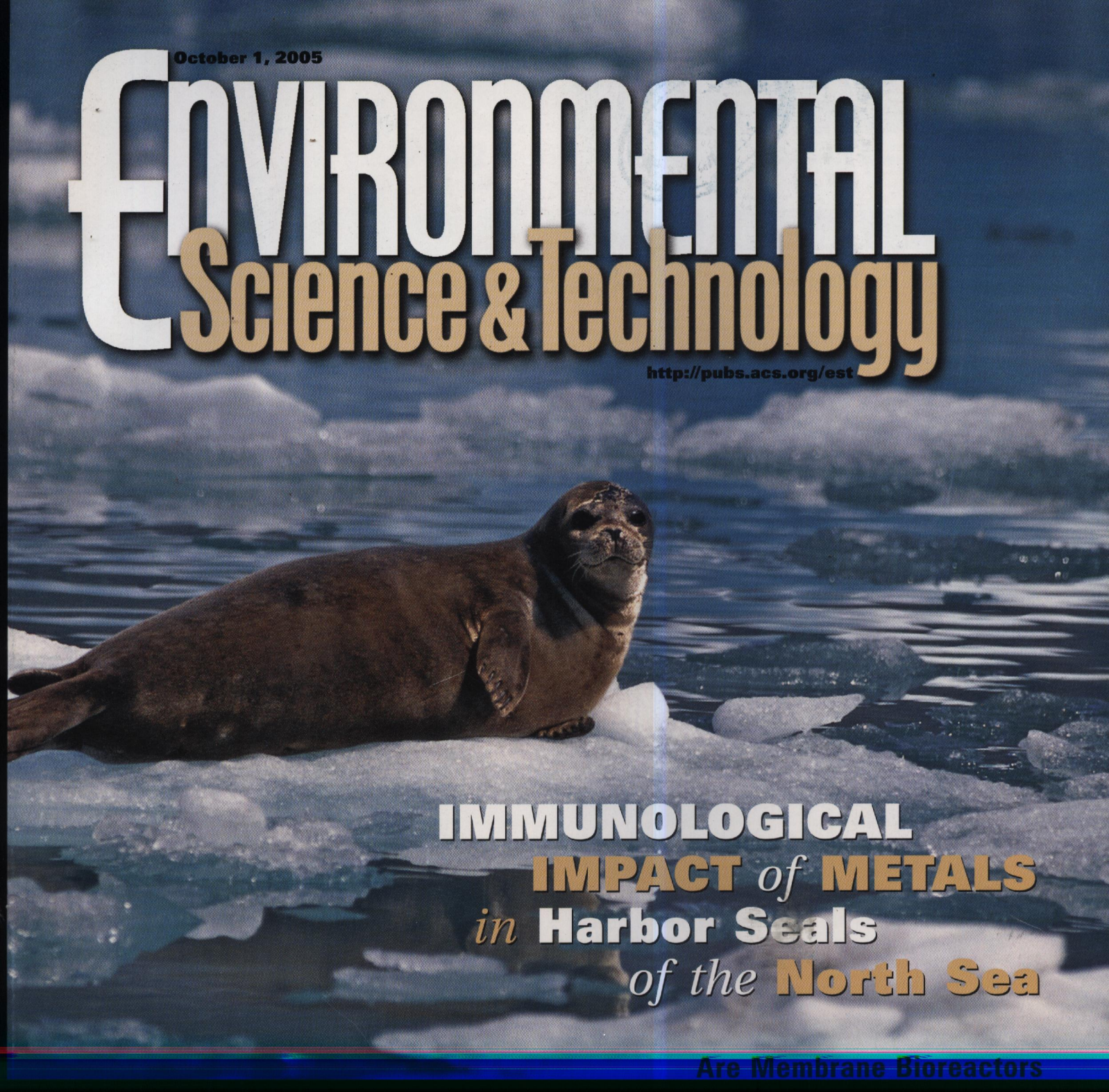


October 1, 2005

# ENVIRONMENTAL Science & Technology

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

A harbor seal is shown resting on a large, white ice floe in the North Sea. The seal is dark brown and is looking towards the camera. The background consists of a blue sea with numerous smaller ice floes scattered throughout.

**IMMUNOLOGICAL  
IMPACT of METALS**  
*in Harbor Seals*  
*of the North Sea*

Are Membrane Bioreactors



7423

### Organophosphorus Flame Retardants and Plasticizers in Swedish Sewage Treatment Plants

Anneli Marklund, Barbro Andersson, and Peter Haglund

The treatment efficiency of sewage treatment plants for organophosphates is generally poor, particularly with chlorinated organophosphates.

7430

### Molecular Characteristics of Urban Organic Aerosols from Nanjing: A Case Study of a Mega-City in China

Gehui Wang and Kimitaka Kawamura

The molecular composition of organic compounds in aerosols is comprehensively identified, and the components are discussed as characteristic compounds/biomarkers in aerosols from different sources/processes.

7439

### Perfluorinated Alkyl Substances in Plasma, Liver, Brain, and Eggs of Glaucous Gulls (*Larus hyperboreus*) from the Norwegian Arctic

Jonathan Verreault, Magali Houde, Geir W. Gabrielsen, Urs Berger, Marianne Haukas, Robert J. Letcher, and Derek C. G. Muir

High concentrations of perfluorinated alkyl substances are detected in plasma, liver, brain, and egg samples of glaucous gulls, a scavenger-predator seabird from the Norwegian Arctic.

## Environmental Processes

7446

### Influence of Dissolved Organic Matter from Waste Material on the Phytotoxicity and Environmental Fate of Triflurosulfuron Methyl

Giovanni Gigliotti, Andrea Onofri, Euro Pannacci, Daniela Businelli, and Marco Trevisa

Hydrophobic DOM added to soil by compost application may influence the environmental fate of triflurosulfuron methyl in amended soils.

7452

### Sorption of Three Tetracyclines by Several Soils: Assessing the Role of pH and Cation Exchange

Stephen A. Sassman and Linda S. Lee

Sorption of tetracyclines by several soils is successfully modeled with a single sorption coefficient normalized to cation exchange capacity and the pH-dependent cationic (+00) species.

7460

### Transformation of Carbon Tetrachloride by Thiol

7476

### An Isotope Exchange Technique to Assess Mechanisms of Sorption Hysteresis Applied to Naphthalene in Kerogenous Organic Matter

Michael Sander and Joseph J. Pignatello

The technique demonstrates true sorption hysteresis and supports irreversible sorbent deformation as the cause.

7485

### Phosphorus Speciation in Manure and Manure-Amended Soils Using XANES Spectroscopy

Shinjiro Sato, Dawit Solomon, Charles Hyland, Quirine M. Ketterings, and Johannes Lehmann

Phosphorus K-edge XANES spectroscopy indicates relatively soluble calcium phosphate species in poultry manure and the transformation of these compounds to more stable species as the manure application continues for >25 yr.

7492

### Voltammetry of Copper Sulfide Particles and Nanoparticles: Investigation of the Cluster Hypothesis

Irena Ciglenc̃ki, Damir Krznarić, and George R. Helz

Semiconductor sulfide nanoparticles are shown to be characterizable voltammetrically; Cu(II) mixed with HS<sup>-</sup> in solution appears to produce nanoparticles, not subnanometer clusters as previously reported.

7499

### Study on the Structure and Mutagenicity of a New Disinfection Byproduct in Chlorinated Drinking Water

Huijuan Gong, Zhen You, Qiming Xian, Xing Shen, Huixian Zou, Xu Xu, and Fei Huan

The structure of a new chlorinated disinfection byproduct in drinking water is identified as TCMCD by multispectra methods, and its mutagenicity is studied.

7509

### Primary Consumer Stable Nitrogen Isotopes as Indicators of Nutrient Source

M. Jake Vander Zanden, Yvonne Vadeboncoeur, Matthew W. Diebel, and Erik Jeppese

Stable nitrogen isotopes ( $\delta^{15}\text{N}$ ) in aquatic biota are indicators of anthropogenic nutrient inputs and may be a promising tool for tracing nutrient pathways in watersheds.

7516

### Fluorotelomer Alcohol Biodegradation—Direct Evidence that Perfluorinated Carbon Chains Break Down

Ning Wang, Bogdan Szostek, Robert C. Buck, Patrick W. Foisom, Lisa M....



## ■ 7535

### **Solubility and Sorption by Soils of 8:2 Fluorotelomer Alcohol in Water and Cosolvent Systems**

Jinxia Liu and Linda S. Lee

The 8:2 fluorotelomer alcohol is highly sorbed to soil organic carbon (OC) and dissolved OC, and it becomes irreversibly sorbed over time.

## 7541

### **Biofilm Formation Characteristics of Bacterial Isolates Retrieved from a Reverse Osmosis Membrane**

Chee Meng Pang, Peiyong Hong, Huiling Guo, and Wen-Tso Liu

The cellular characteristics affecting biofilm formation of RO isolates are investigated and discussed in relation to the physical-chemical properties of three RO membranes.

## 7551

### **A Multivariate Statistical Approach to Spatial Representation of Groundwater Contamination using Hydrochemistry and Microbial Community Profiles**

Paula J. Mouser, Donna M. Rizzo, Wilfred F. M. Röling, and Boris M. van Breukelen

This methodology provides improved parameter estimates that use qualitative and quantitative information (multiple water-quality measurements and genome-based data) from a leachate-contaminated aquifer.

## ■ 7560

### **► Estuarial Fingerprinting through Multidimensional Fluorescence and Multivariate Analysis**

Gregory J. Hall, Kerin E. Clow, and Jonathan E. Kenny

This work establishes that multidimensional fluorescence of DOM can be used as a method for determining the source location of estuarial water.

## 7568

### **► Immunological Impact of Metals in Harbor Seals (*Phoca vitulina*) of the North Sea**

Antje Kakuschke, Elizabeth Valentine-Thon, Simone Griesel, Sonja Fonfara, Ursula Siebert, and Andreas Prange

This study provides evidence that the development of metal sensitivity could provide a relationship between metal concentrations and immunological dysfunction among harbor seals in the North Sea.

## 7576

### **Mechanistic Aspects of Pyrite Oxidation in an Oxidizing Gaseous Environment: An in Situ HATR-IR Isotope Study**

Courtney R. Usher, Kristian W. Paul, Jayakumar Narayansamy, James D. Kubicki, Donald L. Sparks, Martin A. A. Schoonen, and Daniel R. Strongin

## Environmental Measurements Methods

## ■ 7592

### **► Geophysical Imaging of Stimulated Microbial Biomineralization**

Kenneth H. Williams, Dimitrios Ntarlagiannis, Lee D. Slater, Alice Dohnalkova, Susan S. Hubbard, and Jillian F. Banfield

A novel approach is described in which noninvasive geophysical techniques are used to monitor the microbial processes that accompany the bioremediation of metal-contaminated aquifer sediments.

## 7601

### **Assessing Organic Contaminants in Fish: Comparison of a Nonlethal Tissue Sampling Technique to Mobile and Stationary Passive Sampling Devices**

Rebecca M. Heltsley, W. Gregory Cope, Damian Shea, Robert B. Bringolf, Thomas J. Kwak, and Edward G. Malindzak

The attachment of silicone disks to fish and the nonlethal removal of fish adipose fins are two new approaches for assessing organic contaminants in fish and water.

## 7609

### **A Novel Method for Determination of Size-Resolved, Submicrometer Particle Traffic Emission Factors**

Sara Janhäll and Mattias Hallquist

A novel method is presented to determine size-segregated particle number emission factors from traffic; with limited data sets, statistically significant emission factors from traffic can be extracted.

## 7616

### **Simultaneous Determination of Mono- and Dicarboxylic Acids, $\omega$ -Oxo-carboxylic Acids, Midchain Ketocarboxylic Acids, and Aldehydes in Atmospheric Aerosol Samples**

Yun-chun Li and Jian Zhen Yu

The method combines extraction and derivatization in one step and thereby improves recoveries for both high-volatile and less-water-soluble oxygenates.

## 7625

### **Bacterial Bioassay for Rapid and Accurate Analysis of Arsenic in Highly Variable Groundwater Samples**

Pham Thi Kim Trang, Michael Berg, Pham Hung Viet, Nguyen Van Mui, and Jan Roelof van der Meer

An easy-to-use and low-cost microbial, reporter-based test, which uses a bioluminescence-producing arsenic-inducible bacterium that is based on *E. coli* as the reporter organism, is validated.

## ■ 7631

### **Atmospheric Size Distribution of PAHs: Evidence of a High-Volume Sampling Artifact**

Eric G. Sanderson and J.-P. Farant

This field study demonstrates the existence of a sampling artifact for PAHs that is associated with particles under real-world



Norman Y. Kado, Robert A. Okamoto, Paul A. Kuzmicky, Reiko Kobayashi, Alberto Ayala, Michael E. Gebel, Paul L. Rieger, Christine Maddox, and Leo Zafonte

Emissions from in-use configurations of CNG- and low-sulfur ECD-fueled "clean-technology" transit buses, which are representative of current bus fleets, contain a complex mixture of toxic compounds.

## 7650

### Compost-Based Permeable Reactive Barriers for the Source Treatment of Arsenic Contaminations in Aquifers: Column Studies and Solid-Phase Investigations

Ralf Köber, Birgit Daus, Markus Ebert, Jürgen Mattusch, Edmund Welter, and Andreas Dahmke

Arsenic removal from sedimentary aquifers can be accelerated by using compost-based permeable reactive barriers that release sulfide and dissolve arsenic-loaded iron (hydr)oxides.

## 7656

### Fabrication of Catalytic Membranes for the Treatment of Drinking Water Using Combined Ozonation and Ultrafiltration

Bhavana S. Karnik, Simon H. Davies, Melissa J. Baumann, and Susan J. Masten

This work investigates the performance of iron-oxide-coated ceramic membranes in an ozonation-membrane filtration process to produce water of a quality that meets the U.S. EPA's Stage-2 D/DBP Rule.

## 7662

### Removal of Methylated Arsenic in Groundwater with Iron Filings

Zhongqi Cheng, Alexander Van Geen, Roseline Louis, Nikolaos Nikolaidis, and Richard Bailey

The removal of MMA by iron filings is comparable to that of As(V), but removal of DMA is less efficient.

## 7667

### Mercury Ions Removal from Aqueous Solution Using an Activated Composite Membrane

María Elena Páez-Hernández, Karina Aguilar-Arteaga, Carlos Andrés Galán-Vidal, Manuel Palomar-Pardavé, Mario Romero-Romo, and María Teresa Ramírez-Silva

Di-(2-ethylhexyl)dithiophosphoric acid-activated composite membranes remove mercury ions in solutions with rates better than 99%, or from 0.78 to 0.007 ppm in one step.

## 7671

### Secretion of Bacterial Xenobiotic-Degrading Enzymes from Transgenic Plants by an Apoplastic Expressional System: An Applicability for Phytoremediation

E. Uchida, T. Ouchi, Y. Suzuki, T. Yoshida, H. Habe, I. Yamaguchi, T. Omori, and H. Nojima

## 7684

### High Flux Filtration Medium Based on Nanofibrous Substrate with Hydrophilic Nanocomposite Coating

Xuefen Wang, Xuming Chen, Kyunghwan Yoon, Dufei Fang, Benjamin S. Hsiao, and Benjamin Chu

A very high flux filtration medium, containing nonporous nanocomposite coating, electrospun nanofibrous substrate, and conventional nonwoven support, is successfully demonstrated for water treatment.

## 7692

### Efficient Photochemical Decomposition of Long-Chain Perfluorocarboxylic Acids by Means of an Aqueous/Liquid CO<sub>2</sub> Biphasic System

Hisao Hori, Ari Yamamoto, and Shuzo Kutsuna

Persistent and bioaccumulative long-chain (C<sub>9</sub>-C<sub>11</sub>) perfluorocarboxylic acids can be effectively decomposed to F<sup>-</sup> with persulfate ion (S<sub>2</sub>O<sub>8</sub><sup>2-</sup>) in an aqueous/liquid CO<sub>2</sub> biphasic system.

## 7698

### Pharmaceutical Retention Mechanisms by Nanofiltration Membranes

Long D. Nghiem, Andrea I. Schäfer, and Menachem Elimelech

Retention mechanisms of pharmaceuticals by nanofiltration membranes are directly related to their molecular physico-chemical characteristics, membrane pore size and charge, and solution chemistry.

## 7706

### Quantitative Structure-Property Relationships for Enhancing Predictions of Synthetic Organic Chemical Removal from Drinking Water by Granular Activated Carbon

Matthew L. Magnuson and Thomas F. Speth

QSPRs can be used to predict the effect of NOM fouling on activated-carbon adsorption of specific contaminants.

## Sustainability Engineering and Green Chemistry

## 7712

### Mechanisms of Advanced Oxidation Processing on Bentonite Consumption Reduction in Foundry

Yujue Wang, Fred S. Cannon, Sridhar Komarneni, Robert C. Voigt, and J. C. Furness

Laboratory tests reveal how the advanced oxidation process diminishes clay consumption in green sand foundries by the removal of carbon residues on the clay and an ultrasonication-induced delamination.

## 7719

### Fate of Rising CO<sub>2</sub> Droplets in Seawater

Yunqiang Zhang



## Ecotoxicology and Human Environmental Health

7731

### Metal Compartmentation and Speciation in a Soil Sentinel: The Earthworm, *Dendrodrilus rubidus*

Janet Cotter-Howells, John M. Charnock, Carole Winters, Peter Kille, John C. Fry, and A. John Morgan

XAS and EPXMA are used to describe the ligand affinities, coordination chemistries, and subcellular compartmentation of cadmium, lead, and zinc in earthworm tissue.

■ 7741

### Confronting Workplace Exposure to Chemicals with LCA: Examples of Trichloroethylene and Perchloroethylene in Metal Degreasing and Dry Cleaning

Stefanie Hellweg, Evangelia Demou, Martin Scheringer, Thomas E. McKone, and Konrad Hungerbühler

A method for including occupational exposure to chemicals in life-cycle assessment is presented and applied to three case studies.

7749

### Risk Ranking of Bioaccessible Metals from Fly Ash Dissolved in Simulated Lung and Gut Fluids

John Twining, Peter McGlenn, Elaine Loi, Kath Smith, and Reto Gieré

The relative risk of metals in fly ash from coal- or coal-and-tire-based fuels has been estimated from their bioaccessibility in simulated lung and gut fluids.

## Correspondence and Rebuttal

7757

### Comment on "Gonadal Development of Larval Male *Xenopus laevis* Exposed to Atrazine in Outdoor Microcosms"

Tyrone Hayes

7759

### Response to Comment on "Gonadal Development of Larval Male *Xenopus laevis* Exposed to Atrazine in Outdoor Microcosms"

Alarik M. Jooste, Louis H. Du Preez, James A. Carr, John P. Giesy, Timothy S. Gross, Ronald J. Kendall, Ernest E. Smith, Glen J. Van Der Kraak, and Keith R. Solomon

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



## Critical Reviews

7345

### Review of Factors Affecting Microbial Survival in Groundwater

David E. John and Joan B. Rose

Studies evaluating the survival and inactivation of public-health-related microorganisms in groundwater are examined; microbial inactivation is expressed as  $\log_{10}$  decline per day to facilitate the comparisons.

■ 7357

### Chemically Activated Luciferase Gene Expression (CALUX) Cell Bioassay Analysis for the Estimation of Dioxin-Like Activity: Critical Parameters of the CALUX Procedure that Impact Assay Results

Isabelle Windal, Michael S. Denison, Linda S. Birnbaum, Nathalie Van Wouwe, Willy Baeyens, and Leo Goeyens

Critical methodological parameters that can affect the quality and accuracy of dioxin-like activity measurements with the CALUX bioassay are reviewed.

## Policy Analysis

■ 7365

### Landfill-Gas-to-Energy Projects: Analysis of Net Private and Social Benefits

Paulina Jaramillo and H. Scott Matthews

Increased investments in landfill-gas-to-energy projects could lead to greener power with low costs and large social benefits.

## Characterization of Natural and Affected Environments

■ 7374

### Influence of Local Human Population on Atmospheric Polycyclic Aromatic Hydrocarbon Concentrations

William D. Hafner, Daniel L. Carlson, and Ronald A. Hites

Global atmospheric PAH concentrations are strongly correlated to the human population within a 25-km radius of the site.

■ 7380

### Congener-Specific Survey for Polychlorinated Biphenyls in Sediments of Industrialized Bays in Korea: Regional Characteristics and Pollution Sources

## Notices to *ES&T* authors

1. Beginning immediately, *ES&T* will stringently enforce the 7000-word length limit for research manuscripts. Articles are expected to be clear, concise, and comprehensive (not a fragmented story). Manuscripts may exceed the 7000-word limit under highly unusual circumstances, but the length must be justified at submission. Lengthy papers risk being summarily declined. Tables and figures that augment the article but are otherwise unessential to the major themes must be placed in Supporting Information (which is freely accessible on the web). Authors should provide a word count in their cover letter. The count should include all text and references, and 300 words should be added for each figure and table. Large, multipart figures and extensive tables should be counted as 600 words.
2. We are pleased to inaugurate a new subject heading, Ecotoxicology and Human Environmental Health, in recognition of the emerging importance of this field and the increasing number of *ES&T* papers being submitted.
3. Submitted manuscripts must now include email addresses for all coauthors, in addition to full contact information for the corresponding author. Please also provide a list of at least four suggested reviewers and their contact information (email addresses are preferred).

7396

### An Infrared and X-ray Spectroscopic Study of the Reactions of 2-Chlorophenol, 1,2-Dichlorobenzene, and Chlorobenzene with Model CuO/Silica Fly Ash Surfaces

Steven L. Alderman, George R. Farquar, Erwin D. Poliakoff, and Barry Dellinger

In combustion systems, the number of surface-bound PCDD/F phenolate precursors resulting from chlorinated benzenes is  $\sim 2\times$  greater than those from chlorinated phenols.

7402

### Characterization of Polycyclic Aromatic Hydrocarbons (PAHs) in Different Size Fractions in Deposited Road Particles (DRPs) from Lake Biwa Area, Japan

Byung-Cheol Lee, Yoshihisa Shimizu, Tomonari Matsuda, and Saburo Matsui

PAHs, as quantified by instrumental analysis, may account for some of the mechanism of specific biological activity in complex environmental mixtures.

7410

### The Role of Resuspended Soil in Lead Flows in the California South Coast Air Basin

Allison R. Harris and Cliff J. Davidson