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ENVIRONMENTAL Science & Technology

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**Monitoring *the* Response
to Changing MERCURY
DEPOSITION**

Chemical Fingerprinting of Petroleum Biomarkers

Methodology for Predicting OEL from Rodent
LD₅₀ Values for Metals

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THE AMERICAN
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Methyl *tert*-Butyl Ether Occurrence and Related Factors in Public and Private Wells in Southeast New Hampshire

Joseph D. Ayotte, Denise M. Argue, and Frederick J. McGarry

This study reports occurrence and distribution of MTBE in public and private supply wells in southeast New Hampshire and identifies related possible controlling factors.

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Regional Comparisons of Coastal Sediment Contamination Detected by a Biomarker (P450 HRGS; EPA Method 4425)

Jack W. Anderson, S. Ian Hartwell, and M. Jawed Hameedi

A biomarker assay is used in large-scale sediment investigations to rapidly and inexpensively detect levels of CYP1A-inducing compounds.

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Impact of the 2002 Canadian Forest Fires on Particulate Matter Air Quality in Baltimore City

Amir Sapkota, J. Morel Symons, Jan Kleissl, Lu Wang, Marc B. Parlange, John Ondov, Patrick N. Breyse, Gregory B. Diette, Peyton A. Eggleston, and Timothy J. Buckley

Long-range transport of PM from forest fires in Quebec to Baltimore is studied, and its impact on ambient levels and in the homes of susceptible individuals is presented.

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Daniel R. Oros, Dale Hoover, Francois Rodigari, David Crane, and Jose Sericano

The levels and distribution of PBDEs are evaluated in water, surface sediments, and bivalves from the San Francisco Estuary.

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Field Deployment of Thin-Film Passive Air Samplers for Persistent Organic Pollutants: Study in the Urban Atmospheric Boundary Layer

N. J. Farrar, T. Harner, M. Shoeib, A. Sweetman, and K. C. Jones

Polymer-coated glass samplers enable rapid, low-volume sampling of ambient levels of POPs and indicate that PAH and PCB levels decline with height.

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Abundances, Depositional Fluxes, and Homologue Patterns of Polychlorinated Biphenyls in Dated Sediment Cores from the Pearl River Delta, China

Bixian Mai, Eddy Y. Zeng, Xiaojun Luo, Qingshu Yang, Gan Zhang, Xiangdong Li, Guoying Sheng, and Jiamo Fu

Temporal records of PCBs in the Pearl River Delta, China, are reconstructed from dated sediment cores.

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Milwaukee, WI, as a Source of Atmospheric PCBs to Lake Michigan

David M. Wethington, III, and Keri C. Hornbuckle

Notices to *ES&T* authors

1. Effective now, titles must be included in the Reference section of *ES&T* research papers.
2. Effective January 1, 2005, 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.

Results of a field and modeling study show that elevated concentrations of PCBs in Milwaukee air contribute about 120 kg to Lake Michigan annually.

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Atmospheric Reactions Influence Seasonal PAH and Nitro-PAH Concentrations in the Los Angeles Basin

Fabienne Reisen and Janet Arey

The contribution of atmospheric formation through gas-phase radical-initiated PAH reactions is dominant, and the semivolatile nitro-PAHs are most abundant.

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Mass Budget of Perfluorooctane Surfactants in Lake Ontario

Bryan Boulanger, Aaron M. Peck, Jerald L. Schnoor, and Keri C. Hornbuckle

A mass budget of eight perfluorooctane surfactants was developed to identify the main sources of these compounds to Lake Ontario.

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Temporal Trends of PFOS and PFOA in Guillemot Eggs from the Baltic Sea, 1968–2003

Katrin E. Holmström, Ulf Järnberg, and Anders Bignert

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Occurrence, Profiles, and Photostabilities of Chlorinated Polycyclic Aromatic Hydrocarbons Associated with Particulates in Urban Air

Takeshi Ohura, Atsushi Kitazawa, Takashi Amagai, and Masakazu Makino

Occurrence of chlorinated PAHs associated with particulates and their photostabilities are investigated; the atmospheric behavior, sources, and fate are also discussed.

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Pu and U Atom Ratios and Concentration Factors in Reservoir 11 and Asanov Swamp, Mayak, PA: An Application of Accelerator Mass Spectrometry

P. Borretzen, W. J. F. Standring, D. H. Oughton, M. Dowdall, and L. K. Fifield

Atom ratios are presented for plutonium and uranium isotopes in water, soil, grass, and aquatic biota samples collected downstream from Mayak, Pa.

Environmental Processes

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Physiological Basis for Large Differences in Resistance to Nitrite among Freshwater and Freshwater-Acclimated Euryhaline Fishes

Joseph R. Tomasso, Jr., and Martin Grosell

Understanding the relationship between nitrite toxicity and chloride uptake at the gills of freshwater and freshwater-acclimated euryhaline fish allows prediction of nitrite sensitivity.

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

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Carbon Isotopic Fractionation during Anaerobic Biotransformation of Methyl *tert*-Butyl Ether and *tert*-Amyl Methyl Ether

Piyapawn Somsamak, Hans H. Richnow, and Max M. Häggblom

Anaerobic MTBE and TAME degradation exhibit strong evidence of significant carbon isotope fractionation; this demonstrates that the technique can be used as an indicator for biodegradation.

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Dark Oxidation of Dissolved and Liquid Elemental Mercury in Aquatic Environments

Marc Amyot, François M. M. Morel, and Parisa A. Ariya

Elemental mercury (Hg^0) droplets released in salt waters are easily oxidized in the dark, whereas dissolved Hg^0 is more stable.

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High Plankton Densities Reduce Mercury Biomagnification

Celia Y. Chen and Carol L. Folt

Higher plankton biomass and abundance result in lower mercury bioaccumulation in the food web and biomagnification to fish in lakes in the northeastern United States.

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Mechanisms of Dioxin Formation from the High-Temperature Oxidation of 2-Chlorophenol

Catherine S. Evans and Barry Dellinger

The role of oxygen in the formation of PCDD and PCDF from 2-chlorophenol is determined for high-temperature, postflame conditions.

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When Aerosol Sulfate Goes Up, So Does Oxalate: Implication for the Formation Mechanisms of Oxalate

Jian Zhen Yu, Xiao-Feng Huang, Jinhui Xu, and Min Hu

In-cloud processing, a common dominant formation pathway, probably explains the close tracking of the two chemically distinct species.

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Phenanthrene Sorption to Sequentially Extracted Soil Humic Acids and Humins

Seunghun Kang and Baoshan Xing

Aliphaticity of soil humic substances increases with sequential alkaline extractions, whereas their polarity decreases; this results in an increased organic-carbon-normalized sorption coefficient of phenanthrene.

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Importance of Black Carbon to Sorption of Native PAHs, PCBs, and PCDDs in Boston and New York Harbor Sediments

R. Lohmann, J. K. MacFarlane, and P. M. Gschwend

Dissolved concentrations of hydrophobic organic compounds in harbor sediment-water slurries are consistent with the hypothesis that combustion-derived black carbon is serving as an important sorbent.

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Analysis of Column Tortuosity for MnCl_2 and Bacterial Diffusion Using Magnetic Resonance Imaging

Mira Stone Olson, Roseanne M. Ford, James A. Smith, and Erik J. Fernandez

Pseudomonas putida cells experience a column tortuosity 50 times higher than that predicted from diffusion experiments using MnCl_2 .

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Relative Leaching and Aquatic Toxicity of Pressure-Treated Wood Products Using Batch Leaching Tests

Kristin Stook, Thabet Tolaymat, Marnie Ward, Brajesh Dubey, Timothy Townsend, Helena Solo-Gabriele, and Gabriel Bitton

Batch leaching procedures are used to examine the chemical leaching and aquatic toxicity of heavy metals from pressure-treated wood samples.

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Semiempirical Model for Organic Aerosol Growth by Acid-Catalyzed Heterogeneous Reactions of Organic Carbonyls

Myoseon Jang, Nadine M. Czoschke, and Amanda L. Northcross

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Electrochemical Study of 2,3-Dihydroxybenzoic Acid and Its Interaction with Cu(II) and H_2O_2 in Aqueous Solutions: Implications for Wood Decay

Ran Liu, Barry Goodell, Jody Jellison, and Aria Amirbahman

Cyclic voltammetry is used to study the redox reactions involving 2,3-DHBA, Cu(II) , and H_2O_2 to gain a better understanding of the nonenzymatic wood decay mechanisms.

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Zinc Adsorption Effects on Arsenite Oxidation Kinetics at the Birnessite-Water Interface

Laura E. Power, Yuji Arai, and Donald L. Sparks

Sorbed or competitive metal ligands, such as Mn(II) and zinc, strongly influence the extent and rate of As(III) oxidation on birnessite surfaces.

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Speciation of Iron and Sulfate in Acid Waters: Aqueous Clusters to Mineral Precipitates

Juraj Majzlan and Satish C. B. Myneni

The most abundant $\text{Fe}^{\text{III}}\text{-SO}_4$ species in acid waters are hydrogen-bonded complexes, and the structure of poorly ordered $\text{Fe}^{\text{III}}\text{-SO}_4$ precipitates parallels the aqueous speciation.

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Kinetics and Inhibition of Reductive Dechlorination of Chlorinated Ethylenes by Two Different Mixed Cultures

Seungho Yu, Mark E. Dolan, and Lewis Semprini

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Adsorption of Ethylene Glycol Vapor on $\alpha\text{-Al}_2\text{O}_3$ (0001) and Amorphous SiO_2 Surfaces: Observation of Molecular Orientation and Surface Hydroxyl Groups as Sorption Sites

Dingfang Liu, Gang Ma, Man Xu, and Heather C. Allen

Adsorption of ethylene glycol forms hydrogen bonds with adsorbed water molecules on the $\alpha\text{-Al}_2\text{O}_3$ (0001) surface and with silanol OH groups on the SiO_2 surface.

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Enrichment of Stable Carbon and Hydrogen Isotopes during Anaerobic Biodegradation of MTBE: Microcosm and Field Evidence

Tomasz Kuder, John T. Wilson, Phil Kaiser, Ravi Kolhatkar, Paul Philp, and Jon Allen

Compound-specific stable isotope analysis is used to characterize microcosm and field anaerobic biodegradation of MTBE.

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Effects of Fe(II) and Hydrogen Peroxide Interaction upon Dissolving UO_2 under Geologic Repository Conditions

M. Amme, W. Bors, C. Michel, K. Stettmaier, G. Rasmussen, and M. Betti

Electron spin resonance, scanning electron microscopy, and kinetic modeling are used to test UO_2 nuclear fuel dissolution ver-

of uranium peroxide precipitation in the presence of Fe(II) and H₂O₂ (Fenton systems).

Environmental Modeling

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Reduction of 2,4,6-Trinitrotoluene by Iron Metal: Kinetic Controls on Product Distributions in Batch Experiments

Joel Z. Bandstra, Rosemarie Miehr, Richard L. Johnson, and Paul G. Tratnyek

Diagnostic modeling of batch kinetic data shows how experimental conditions affect the products and mass balance from reduction of 2,4,6-trinitrotoluene by zerovalent iron.

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Modeling of Porous Filter Permeability via Image-Based Stochastic Reconstruction of Spatial Porosity Correlations

Fu Zhao, Heather R. Landis, and Steven J. Skerlos

A methodology for producing a pore-scale, 3-D computational filter permeability model is developed based on analysis of 2-D images of filter matrixes and first principles.

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X-ray Absorption Near-Edge Structure Analysis of Arsenic Species for Application to Biological Environmental Samples

Paula G. Smith, Iris Koch, Robert A. Gordon, Dina F. Mandoli, Brandon D. Chapman, and Kenneth J. Reimer

This resource for XAS users studying arsenic in biological environmental samples characterizes XANES results for arsenic compounds common in both aquatic and terrestrial environments.

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Chemical Fingerprinting of Petroleum Biomarkers Using Time Warping and PCA

Jan H. Christensen, Giorgio Tomasi, and Asger B. Hansen

Preprocessing of GC-MS chromatograms (derivatization, normalization, and alignment) combined with principal component analysis is used for chemical fingerprinting of petroleum hydrocarbons.

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Field Calibration of Rapidly Equilibrating Thin-Film Passive Air Samplers and Their Potential Application for Low-Volume Air Sampling Studies

N. J. Farrar, T. J. Harner, A. J. Sweetman, and K. C. Jones

To assess compound uptake rates and their time to approach equilibrium, polymer-coated glass samplers are exposed for up to 18 d; results confirm theoretical predictions.

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Real-Time Visualization and Quantification of PAH Photodegradation on and within Plant Leaves

Edward Wild, John Dent, Gareth O. Thomas, and Kevin C. Jones

Two-photon excitation microscopy is used to visualize and quantify PAH compound photodegradation on and within living plant leaves in real time.

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New Device and Method for Flux-Proportional Sampling of Mobile Solutes in Soil and Groundwater

Hubert de Jonge and Gadi Rothenberg

A new, alternative passive sampling method is introduced that functions as a water-permeable, semi-infinite sink for passing solutes of interest.

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Potential Use of a Host-Associated Molecular Marker in *Enterococcus faecium* as an Index of Human Fecal Pollution

Troy M. Scott, Tracie M. Jenkins, Jerzy Lukasik, and Joan B. Rose

Detection of the *esp* gene in *E. faecium* as an index of human fecal pollution is described.

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Selective Quantification of Trace Palladium in Road Dusts and Roadside Soils by Displacement Solid-Phase Extraction On-line Coupled with Electrothermal Atomic Absorption Spectrometry

Jing Fang, Yan Jiang, Xiu-Ping Yan, and Zhe-Ming Ni

Selective and sensitive determination of trace palladium in environmental materials by on-line coupling of displacement solid-phase extraction to electrothermal atomic absorption spectrometry is discussed.

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Bioaccumulation of Organic Chemicals in Contaminated Soils: Evaluation of Bioassays with Earthworms

Tjalling Jager, Leon van der Wal, Roel H. L. J. Fleuren, Arjan Barendregt, and Joop L. M. Hermens

The relevance of earthworm bioassays for assessing bioavailability of organic contaminants is evaluated by comparing different species and by comparing results with those from field-collected worms.

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Reliability of a Commercial Kit To Test Groundwater for Arsenic in Bangladesh

A. van Geen, Z. Cheng, A. A. Seddique, M. A. Hoque, A. Gelman, J. H. Graziano, H. Ahsan, F. Parvez, and K. M. Ahmed

A kit used to test millions of wells in Bangladesh has generated valuable arsenic data and could be improved further with a minor modification.

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New Field Method: Gas Push-Pull Test for the In Situ Quantification of Microbial Activities in the Vadose Zone

Karina Urmann, Graciela Gonzalez-Gil, Martin H. Schroth, Markus Hofer, and Josef Zeyer

A field method is developed to assess microbial activities in situ in the vadose zone; microbial methane oxidation above a petroleum-contaminated aquifer is used as the example.

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Edward Peltier, Amy L. Dahl, and Jean-François Gaillard

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Solvent Release into a Sandy Aquifer. 2. Estimation of DNAPL Mass Based on a Multiple-Component Dissolution Model

Kim Broholm, Stanley Feenstra, and John A. Cherry

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Bioremediation of Diethylhexyl Phthalate-Contaminated Soil: A Feasibility Study in Slurry- and Solid-Phase Reactors

P. Di Gennaro, E. Collina, A. Franzetti, M. Lasagni, A. Luridiana, D. Pitea, and G. Bestetti

A slurry- and solid-phase bench-scale study is conducted to assess the feasibility of bioremediating DEHP-polluted soil and the influence of limiting factors.

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