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ENVIRONMENTAL Science & Technology

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Scrutinizing
Pharmaceuticals
and **PERSONAL CARE**
PRODUCTS *in*
Wastewater Treatment

**Arsenic and Lead
Leaching from the
Fertilizer Ironite**

**PBDE Contamination
of United States Food**

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THE AMERICAN
CHEMICAL SOCIETY**

Policy Analysis

5265

Clean Water Act Assessment Processes in Relation to Changing U.S. Environmental Protection Agency Management Strategies

William S. Cooter

Suggestions for improved integration of Clean Water Act management and assessment programs are presented; the value of modeling approaches in properly balanced systems is stressed.

Characterization of Natural and Affected Environments

5274

Emissions of Polycyclic Aromatic Hydrocarbons from Batch Hot-Mix Asphalt Plants

Wen-Jhy Lee, Wen-Hui Chao, Minliang Shih, Cheng-Hsien Tsai, Thomas Jeng-Ho Chen, and Perng-Jy Tsai

Although an exhaust hood installed on top of the discharging chute has little effect on removal of total PAHs, it reduces carcinogenic potencies associated with PAH emissions.

5281

Speciation of PM₁₀ Sources of Airborne Nonferrous Metals within the 3-km Zone of Lead/Zinc Smelters

Yann Batonneau, Claude Bremard, Leon Gengembre, Jacky Laureyns, Agnes Le Maguer, Didier Le Maguer, Esperanza Perdrix, and Sophie Sobanska

The PM₁₀-bound lead and zinc airborne sources within the 3-km zone of smelters are sulfide, sulfate, oxide emissions, and wind-blown PM₁₀ of polluted soils and waste slag.

■ 5290

Annual Variations of Pesticide Concentrations in Great Lakes Precipitation

Daniel L. Carlson, Ilora Basu, and Ronald A. Hites

Concentrations of currently used pesticides peak in the summer, whereas concentrations of banned pesticides generally peak in the winter.

5297

Biota-Sediment Accumulation Factors for Polychlorinated Biphenyls, Dibenzo-*p*-Dioxins, and Dibenzofurans in Southern Lake Michigan Lake Trout (*Salvelinus namaycush*)

Lawrence P. Burkhard, Philip M. Cook, and Marta T. Lukasewycz

High-quality, age-specific biota-sediment accumulation factors range from <0.1 to 18 for PCBs and from <0.001 to 0.32 for PCDDs and PCDFs detected in fish.

5306

► Polybrominated Diphenyl Ethers Contamination of United States Food

Arnold Schechter, Olaf Pöpke, Kuang-Chi Tung, Daniele Staskal, and Linda Birnbaum

This first U.S. market-basket food survey for polybrominated diphenyl ethers finds contamination of almost all samples, at the highest levels in the world.

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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.

5312

► Passive Sampling Survey of Polybrominated Diphenyl Ether Flame Retardants in Indoor and Outdoor Air in Ottawa, Canada: Implications for Sources and Exposure

Bryony H. Wilford, Tom Harner, Jiping Zhu, Mahiba Shoeib, and Kevin C. Jones

Home air contains PBDE levels approximately 50× higher than levels in outdoor air; this may represent a significant addition to human exposure and a diffuse regional source.

5319

Trace Metal and Major Ion Inputs into the Olenangy River from an Urban Storm Sewer

Christopher B. Gardner and Anne E. Carey

Concentrations of major ions and dissolved trace metals in highway runoff are compared and contrasted with concentrations upstream; results provide insight into background runoff components.

5327

VOCs in Shallow Groundwater in New Residential/Commercial Areas of the United States

Paul J. Squillace, Michael J. Moran, and Curtis V. Price

At least one VOC is detected in 88% of the samples, and at least two in 69% of the samples; chloroform, toluene, and perchloroethene are the most frequent.

5339

Chloroacetanilide Herbicide Metabolites in Wisconsin Groundwater: 2001 Survey Results

Jeffrey K. Postle, Bruce D. Rheineck, Paula E. Allen, Jon O. Baldock, Cody J. Cook, Randy Zogbaum, and James P. VandenBrook

Statistical estimates from the results of a study of agricultural chemicals in Wisconsin groundwater indicate that chloroacetanilide herbicide metabolites occur in ~30% of drinking-water wells in the state.

5344

Radiocarbon Apportionment of Fossil versus Biofuel Combustion Sources of Polycyclic Aromatic Hydrocarbons in the Stockholm Metropolitan Area

Manolis Mandalakis, Örjan Gustafsson, Christopher M. Reddy, and Li Xu

Radiocarbon source apportionment and a detailed energy balance suggest that the ambient PAH burden, per unit energy produced, is similar for fossil fuels and biofuels.

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

► This issue contains a news story about this research.

5350**Indoor and Outdoor Polycyclic Aromatic Hydrocarbons in Residences Surrounding a Söderberg Aluminum Smelter in Canada**

Eric G. Sanderson and J.-P. Farant

Matched indoor and outdoor ambient air concentrations for residences indicate that the presence of 4–6-ring PAHs indoors is linked to the nearby aluminum smelter.

5357**Transport of Gas-Phase Polycyclic Aromatic Hydrocarbons to the Venice Lagoon**

Andrea Gambaro, Laura Manodori, Ivo Moret, Gabriele Capodaglio, and Paolo Cescon

In a study of the chemical contamination of the Venice lagoon atmosphere, the marine source of PAHs must be considered as well as the continental input.

5365**Accumulation of Arsenic in Drinking-Water Distribution Systems**

Darren A. Lytle, Thomas J. Sorg, and Christy Fritsch

Solids collected from drinking-water distribution systems (pipe sections and hydrant flush solids) are found to contain significant levels of arsenic.

5373**Structure Elucidation and Characterization of Polychlorinated Biphenyl Carboxylic Acids as Major Constituents of Chromophoric Dissolved Organic Matter in Seawater**

Daniel J. Repeta, Nicholas T. Hartman, Seth John, A. Daniel Jones, and Ralf Goericke

The structures and distributions of novel tetrachlorobiphenyl carboxylic acids as major components of colored, dissolved organic matter in seawater are reported.

5379**Perfluoroalkyl Contaminants in a Food Web from Lake Ontario**

Jonathan W. Martin, D. Michael Whittle, Derek C. G. Muir, and Scott A. Mabury

Diporeia, a macroinvertebrate occupying the lowest trophic level, contains the highest mean concentration for each fluorinated contaminant of all organisms analyzed; this finding suggests that sediment is the major contaminant source.

5386**Temperature Dependence of the Distribution of Organochlorine Compounds in the Mosses of the Andean Mountains**

Joan O. Grimalt, Francesca Borghini, Juan C. Sanchez-Hernandez, Ricardo Barra, Carlos J. Torres García, and Silvano Focardi

The accumulation of organochlorine compounds, namely pentachlorobenzene, hexachlorobenzene, hexachlorocyclohexanes, and the more volatile polychlorobiphenyls, in Andean mosses depends on the altitudinal and latitudinal temperature gradients.

Environmental Processes

5393**Geochemical Modulation of Pesticide Sorption on Smectite Clay**

Hui Li, Brian J. Teppen, David A. Laird, Cliff T. Johnston, and Stephen A. Boyd

The extent of polar pesticide sorption is manipulated via modulating K^+ and Ca^{2+} populations, demixing, and nanostructures of smectite clay.

5400**► Arsenic and Lead Leaching from the Waste-Derived Fertilizer Ironite**

Brajesh Dubey and Timothy Townsend

Ironite, a waste-derived fertilizer, is examined for leachable lead and arsenic concentrations.

5405**Air–Water Transfer of MTBE, Its Degradation Products, and Alternative Fuel Oxygenates: The Role of Temperature**

Hans Peter H. Arp and Torsten C. Schmidt

Temperature strongly affects the air–water transfer of gasoline oxygenates and their atmospheric degradation products and thus significantly influences their environmental fate.

5413**Hydrophilic and Hydrophobic Sorption of Organic Acids by Variable-Charge Soils: Effect of Chemical Acidity and Acidic Functional Group**

Seunghun Hyun and Linda S. Lee

Organic acid sorption by variable-charge soils is well described using effective surface charge characteristics; speciation, as defined by chemical acidity and solution pH; and organic carbon content.

5420**Quantifying Unfrozen Water in Frozen Soil by High-Field 2H NMR**

Tobias Sparrman, Mats Öquist, Leif Klemmedtsson, Jürgen Schleucher, and Mats Nilsson

Availability of liquid water in frozen soils is measured with a non-destructive method, allowing estimation of wintertime biological activity in biogeochemical cycles.

5426**EXAFS Study of Zn Sorption Mechanisms on Montmorillonite**

Shinwoo Lee, Paul R. Anderson, Grant B. Bunker, and Cahit Karanfil

Long-term studies of Zn sorption onto clay minerals suggest that formation of mixed-metal coprecipitates reduces the mobility of zinc in soils and sediments.

5433**Thermodynamics of Nitroaromatic Compound Adsorption from Water by Smectite Clay**

Hui Li, Brian J. Teppen, Cliff T. Johnston, and Stephen A. Boyd

Enthalpies are measured for adsorption of nitroaromatic compounds from water by smectites and then converted to values comparable with estimates from computational chemistry.

5443**Proton Binding onto Soil by Nonelectrostatic Models: Isolation and Identification of Mineral Contributions**

Francesca Pagnanelli, Lorena Bornoroni, and Luigi Toro

The mineral contributions in proton binding onto soils are investigated by forming a simulated mineral mixture and developing nonelectrostatic models.

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

► This issue contains a news story about this research.

Environmental Modeling

5450

Cyclic Exchanges and Level of Coupling between Environmental Media: Intermedia Feedback in Multimedia Fate Models

M. Margni, D. W. Pennington, D. H. Bennett, and O. Jolliet

The feedback correction factor is introduced; analytical solutions are developed for its calculation; and detailed, illustrative results are presented.

Remediation and Control Technologies

5458

Addition of Carbon Sorbents to Reduce PCB and PAH Bioavailability in Marine Sediments: Physicochemical Tests

John R. Zimmerman, Upal Ghosh, Rod N. Millward, Todd S. Bridges, and Richard G. Luthy

Higher effectiveness of activated carbon over coke in reducing availability of hydrophobic organic contaminants is attributed to greater specific surface area and favorable pore structure.

5465

Identification of the Reactive Oxygen Species Responsible for Carbon Tetrachloride Degradation in Modified Fenton's Systems

Brant A. Smith, Amy L. Teel, and Richard J. Watts

Superoxide radical anion ($O_2^{\cdot-}$), a major product of an iron (III)-driven initiation reaction, is the species responsible for CT transformation.

5470

Electrochemical Oxidation as a Final Treatment of Synthetic Tannery Wastewater

Marco Panizza and Giacomo Cerisola

This work verifies the feasibility of using an electrochemical process as a final purifying treatment of synthetic tannery wastewater after biological oxidation.

5476

Degradation of Endocrine Disrupting Chemicals Bisphenol A, Ethinyl Estradiol, and Estradiol during UV Photolysis and Advanced Oxidation Processes

Erik J. Rosenfeldt and Karl G. Linden

When compared with direct UV photolysis treatment, UV/ H_2O_2 advanced oxidation is more effective in degradation of these endocrine-disrupting chemicals.

Correspondence/Rebuttals

5484

Comment on "Intermittent Rainfall in Dynamic Multimedia Fate Modeling"

Maximilian Stroebe, Martin Scheringer, and Edgar G. Hertwich

5485

Comment on "Sorption Nonlinearity for Organic Contaminants with Diesel Soot: Method Development and Isotherm Interpretation"

Shaoying Qi

5486

Response to Comment on "Sorption Nonlinearity for Organic Contaminants with Diesel Soot: Method Development and Isotherm Interpretation"

Thanh H. Nguyen, Isam Sabbah, and William P. Ball

Additions and Corrections

5488

Sorption Nonlinearity for Organic Contaminants with Diesel Soot: Method Development and Isotherm Interpretation

Thanh H. Nguyen, Isam Sabbah, and William P. Ball