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ENVIRONMENTAL Science & Technology

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TOXICITY *Increases*
in Ice **Containing**
Monochlorophenols

EPA's First Science Advisor Focuses on the Basics
Fluorotelomer Alcohol Biodegradation

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Policy Analysis

2737

Economic and Health Risk Trade-Offs of Swim Closures at a Lake Michigan Beach

Sharyl J. M. Rabinovici, Richard L. Bernknopf, Anne M. Wein, Don L. Coursey, and Richard L. Whitman

A framework is presented for analyzing the economic, health, and recreation implications of swim closure policies related to high fecal indicator bacteria levels.

Characterization of Natural and Affected Environments

2746

Latitudinal Fractionation of Polychlorinated Biphenyls in Surface Seawater along a 62° N–89° N Transect from the Southern Norwegian Sea to the North Pole Area

Anna Sobek and Örjan Gustafsson

Ultra-clean sampling methodology suggests a northward shift in the PCB fingerprint, with concentrations decreasing to 10–100 fg/L for most abundant congeners in the high Arctic.

■ 2752

Distribution and Toxicity of Sediment-Associated Pesticides in Agriculture-Dominated Water Bodies of California's Central Valley

D. P. Weston, J. You, and M. J. Lydy

Increasing use of pyrethroid insecticides appears to be contributing to widespread sediment toxicity in agriculture-affected streams and irrigation canals of Central California.

■ 2760

Chlordanes in the Indoor and Outdoor Air of Three U.S. Cities

John H. Offenberg, Yelena Y. Naumova, Barbara J. Turpin, Steven J. Eisenreich, Maria T. Morandi, Thomas Stock, Steven D. Colome, Arthur M. Winer, Dalia M. Spektor, Jim Zhang, and Clifford P. Weisel

Of the 112 residences that were measured simultaneously indoors and out for chlordane, 24 demonstrated calculated indoor source strengths of more than 2000 ng per hour.

■ 2769

Characterization of Atmospheric Ammonia Emissions from a Commercial Chicken House on the Delmarva Peninsula

Ronald L. Siefert, Joseph R. Scudlark, Amelia G. Potter, Kirsten A. Simonsen, and Karen B. Savidge

Gas-phase ammonia dispersion downwind of a side-wall ventilated chicken house is measured using a 3-D sampling grid with inverse modeling to determine source strength.

■ 2779

Temporal Trends and Spatial Distributions of Brominated Flame Retardants in Archived Fishes from the Great Lakes

Ling Yan Zhu and Ronald A. Hites

Polybrominated diphenyl ether concentrations in lake trout from the five Great Lakes have increased exponentially with time, doubling every 3–4 years.

2785

Transport of Suspended-Sediment-Bound Toxaphene in the Mississippi River

Jonathan D. Raff and Ronald A. Hites

Sediment-bound toxaphene concentrations and instantaneous loads measured at locations along the Mississippi River are used to identify potential sources.

2792

Zn Speciation in the Organic Horizon of a Contaminated Soil by Micro-X-ray Fluorescence, Micro- and Powder-EXAFS Spectroscopy, and Isotopic Dilution

Géraldine Sarret, Jérôme Balesdent, Lamia Bouziri, Jean-Marie Garnier, Matthew A. Marcus, Nicolas Geoffroy, Frédéric Panfili, and Alain Manceau

Zinc present in the organic horizon of a smelter-impacted soil is highly labile and predominantly complexed to oxygen functional groups from soil organic matter.

2802

Full-Scale Chamber Investigation and Simulation of Air Freshener Emissions in the Presence of Ozone

Xiaoyu Liu, Mark Mason, Kenneth Krebs, and Leslie Sparks

Emissions and chemical degradation of VOCs from one electrical plug-in-type air freshener with pine-scented refills are investigated in the presence of ozone.

2813

Historical Variations in the Stable Isotope Composition of Mercury in Arctic Lake Sediments

Togwell A. Jackson, Derek C. G. Muir, and Warwick F. Vincent

The stable isotope composition of mercury in a dated core from an Arctic lake varies with sediment age and chemistry, suggesting isotope fractionation.

■ 2822

Spectroscopic and Diffraction Study of Uranium Speciation in Contaminated Vadose Zone Sediments from the Hanford Site, Washington State

Jeffrey G. Catalano, Steven M. Heald, John M. Zachara, and Gordon E. Brown, Jr.

Spectroscopic and diffraction analyses of contaminated sediments from the Hanford site reveal that uranium has precipitated as sodium boltwoodite.

Environmental Processes

2829

Groundwater Acidification and the Mobilization of Trace Metals in a Sandy Aquifer

Claus Kjoller, Dieke Postma, and Flemming Larsen

Field and modeling studies are presented that show the formation of a geochemical trace-metal trap at a downward-migrating acidification front in a sandy aquifer.

2836

Lead Sorption on Ruthenium Oxide: A Macroscopic and Spectroscopic Study

Kirk G. Scheckel, Christopher A. Impellitteri, and James A. Ryan

Investigation of lead's reaction with ruthenium oxide shows an extremely high adsorption capacity and an enormously high rate of retention for kinetic times of 1 h to 1 year.

■ 2843

Kinetic Studies on Sb(III) Oxidation by Hydrogen Peroxide in Aqueous Solution

François Quentel, Montserrat Filella, Catherine Elleouet, and Christian-Louis Madec

Antimony(III) oxidation by hydrogen peroxide is studied over a range of environmentally relevant Sb and H₂O₂ concentrations and pH and ionic strength conditions.

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

2849

Surface Photochemistry of Pesticides: An Approach Using Diffuse Reflectance and Chromatography Techniques

José P. Da Silva and Luis F. Vieira Ferreira

The main photodegradation processes of triadimefon at the solid/gas interface involve the α -cleavage while triadimenol undergoes dechlorination.

2857

Fluorotelomer Alcohol Biodegradation Yields Poly- and Perfluorinated Acids

Mary Joyce A. Dinglasan, Yun Ye, Elizabeth A. Edwards, and Scott A. Mabury

Aerobic biodegradation of the 8:2 telomer alcohol produced the 8:2 telomer unsaturated acid as the major metabolite and PFOA as a minor metabolite, evidence for β -oxidation mechanism.

■ 2865

Influence of Natural Organic Matter Source on Copper Speciation As Demonstrated by Cu Binding to Fish Gills, by Ion Selective Electrode, and by DGT Gel Sampler

Chad D. Luidner, John Crusius, Richard C. Playle, and P. Jeff Curtis

All three methods show that Cu binding by natural organic matter in water increases with its increasing allochthonous character, measured as specific absorbance.

2873

Toxicity Increases in Ice Containing Monochlorophenols upon Photolysis: Environmental Consequences

Luděk Bléha, Jana Klénová, Petr Klán, Jaroslav Janošek, Michal Škarek, and Radovan Růžička

Phototransformations of chloroorganic compounds in ice and snow represent a potential secondary source of toxic contaminants as demonstrated with a monochlorophenol model.

2879

Competition for Sorption and Degradation of Chlorinated Ethenes in Batch Zero-Valent Iron Systems

Jan Dries, Leen Bastiaens, Dirk Springael, Spiros N. Agathos, and Ludo Diels

Organic compounds common to contaminated groundwater impact the sorption and degradation of chlorinated ethenes in batch zero-valent iron systems by competition for reaction or sorption sites.

Environmental Modeling

2885

Pesticide Volatilization from Plants: Improvement of the PEC Model PELMO Based on a Boundary-Layer Concept

André Wolters, Minze Leistra, Volker Linnemann, Michael Klein, Andreas Schäffer, and Harry Vereecken

A boundary-layer approach included in PELMO enables the simultaneous calculation of pesticide volatilization from soil and plants and the consideration of competing processes.

2894

Simultaneous Modeling of Multiple End Points in Life-Cycle Toxicity Tests

Tjalling Jager, Trudie Crommentuyn, Cornelis A. M. van Gestel, and Sebastiaan A. L. M. Kooijman

A process-based model describes life-cycle toxicity data for cadmium and triphenyltin in *Folsomia candida* with few physiologically relevant parameters and is used to explore population consequences.

■ 2901

Modeling of Simultaneous Exchange of Colloids and Sorbing Contaminants between Streams and Streambeds

Jianhong Ren and Aaron I. Packman

A new process-based model is presented that predicts the role of colloids in mediating advective contaminant exchange between streams and streambeds.

Environmental Measurements Methods

■ 2912

Integrated Methodology for Forensic Oil Spill Identification

Jan H. Christensen, Asger B. Hansen, Giorgio Tomasi, John Mortensen, and Ole Andersen

Analytical and statistical procedures are integrated into a fast and objective forensic oil spill identification methodology.

2919

Preservation of As(III) and As(V) in Drinking Water Supply Samples from Across the United States Using EDTA and Acetic Acid as a Means of Minimizing Iron-Arsenic Coprecipitation

Patricia A. Gallagher, Carol A. Schwegel, Amy Parks, Bryan M. Gamble, Larry Wymer, and John T. Creed

As(III) and As(V) can be preserved in drinking waters during transport by adding EDTA and acetic acid.

Remediation and Control Technologies

2928

Effects of TiO₂ Surface Modifications on Photocatalytic Oxidation of Arsenite: The Role of Superoxides

Jungho Ryu and Wonyong Choi

This study demonstrates that superoxides are mainly responsible for the photocatalytic oxidation of As(III) by investigating the kinetics in pure and surface-modified TiO₂ suspensions.

2934

Identification of Inhibitory Substances Affecting Bioleaching of Heavy Metals from Anaerobically Digested Sewage Sludge

Xiangyang Gu and Jonathan W. C. Wong

Acetic and propionic acids are identified as the substances responsible for the inhibition of iron oxidation and metal solubilization during the bioleaching of anaerobically digested sewage sludge.

2940

Acoustically Enhanced Multicomponent NAPL Ganglia Dissolution in Water Saturated Packed Columns

Constantinos V. Chrysikopoulos and Eric T. Vogler

This study examines the impact of acoustic pressure waves on multicomponent nonaqueous-phase liquid ganglia dissolution in water-saturated columns packed with glass beads.

2946

Radioactively Contaminated Electric Arc Furnace Dust as an Addition to the Immobilization Mortar in Low- and Medium-Activity Repositories

Marta Castellote, Esperanza Menéndez, Carmen Andrade, Pablo Zuloaga, Mariano Navarro, and Manuel Ordóñez

This paper undertakes a durability study of radioactive contaminated EAFD as an addition in the immobilizing mortar of low- and medium-activity repositories.