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ENVIRONMENTAL Science & Technology

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PBDEs *in the* **Environment** and *in* **People**



**Hexachlorocyclohexanes in the
North American Atmosphere**

**In Vitro and in Vivo Antiestrogenic
Effects of Polycyclic Musks**

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1017

Microscale Distribution of Cesium Sorbed to Biotite and Muscovite

James P. McKinley, John M. Zachara, Steven M. Heald, Alice Dohnalkova, Matthew G. Newville, and Steve R. Sutton

Potassium-deficient frayed edge sites, responsible for the strong retention of Cs⁺, are located at the edges and interiors of micas.

1024

Hydrogen Thresholds as Indicators of Dehalorespiration in Constructed Treatment Wetlands

Gabriel Kassenga, John H. Pardue, William M. Moe, and Kimberly S. Bowman

H₂ concentrations are used to identify dehalorespiring and co-metabolic microbial populations that degrade chlorinated solvents in treatment wetland soils.

1031

Kinetics and Mechanism of As₂S₃ (am) Dissolution under N₂

Ruxandra M. Floroiu, Allen P. Davis, and Alba Torrents

Dissolution of As₂S₃ (am) is independent of pH 2–5 and increases at high pH; As(III) and sulfide are the major species released.

■ 1038

Arsenic Behavior in Paddy Fields during the Cycle of Flooded and Non-flooded Periods

Yoshio Takahashi, Reiko Minamikawa, Kéiko H. Hattori, Katsuaki Kurishima, Nobuharu Kihou, and Kouichi Yuita

Dissolved As concentration in paddy fields increased during the flooded period because of the reductive dissolution of Fe hydroxides and reduction of As(V) to As(III).

1045

Carbon Tetrachloride Transformation on the Surface of Nanoscale Biogenic Magnetite Particles

Michael L. McCormick and Peter Adriaens

The products and intermediates of carbon tetrachloride transformation by biogenic magnetite indicate reduction via three pathways: hydrogenolysis, carbene hydrolysis, and carbene reduction.

■ 1054

Debromination of Polybrominated Diphenyl Ether Congeners BDE 99 and BDE 183 in the Intestinal Tract of the Common Carp (*Cyprinus carpio*)

Heather M. Stapleton, Robert J. Letcher, and Joel E. Baker

Laboratory exposure studies demonstrate significant debromination of polybrominated diphenyl ether congeners in the common carp.

1062

Formation of Dioxins from Incineration of Foods Found in Domestic Garbage

Takeo Katami, Akio Yasuhara, and Takayuki Shibamoto

Incineration of domestic food wastes is shown to be one of the sources of dioxins in the environment.

1066

Hydrolytic Stability of Toluene Diisocyanate and Polymeric Methylenediphenyl Diisocyanate-Based Polyureas under Environmental Conditions

Vahid Sendjarevic, Aisa Sendjarevic, Ibrahim Sendjarevic, Robert E. Bailey, Denis Pemberton, and Kurt A. Reimann

Polyureas formed from the reaction of toluene diisocyanate and polymeric methylenediphenyl diisocyanate with water are predicted to hydrolyze with a half-life of millennia under ambient conditions.

1073

Cadmium Induction of Metallothionein Isoforms in Juvenile and Adult Mussel (*Mytilus edulis*)

Corina M. Ciocan and Jeanette M. Rotchell

Metallothionein isoforms in juvenile and adult mussel (*Mytilus edulis*) are induced following experimental exposure to cadmium.

Environmental Modeling

■ 1079

Use of the Relative Concentration To Evaluate a Multimedia Model for PAHs in the Absence of Emission Estimates

Yunah Lee, Dong Soo Lee, Seung-Kyu Kim, Yoon Kwan Kim, and Dong Won Kim

A multimedia fate model is evaluated for PAHs by comparing the relative concentrations calculated from model predictions with those from environmental monitoring data.

1089

Source Apportionment of Visibility Impairment Using a Three-Dimensional Source-Oriented Air Quality Model

Qi Ying, Mitchell Mysliwiec, and Michael J. Kleeman

A source-oriented mechanistic air quality model was coupled with a Mie scattering calculation to directly reveal the sources of visibility degradation in Los Angeles.

1102

Vinyl Chloride and *cis*-Dichloroethene Dechlorination Kinetics and Microorganism Growth under Substrate-Limiting Conditions

Alison M. Cupples, Alfred M. Spormann, and Perry L. McCarty

A model to predict the effect of limiting substrate concentrations (electron donor and acceptor) as well as DCE and VC dechlorination and microorganism growth is examined experimentally.

Environmental Measurements Methods

1108

Reverse-Phase HPLC Method for Measuring Polarity Distributions of Natural Organic Matter

Ksenija Namjesnik-Dejanovic and Stephen E. Cabaniss

A reverse-phase HPLC method is developed to measure polarity distributions of NOM samples and is applied to both isolated and unconcentrated aquatic samples.

■ 1115

Assessment of Novel Diazinon Immunoassays for Water Analysis

Eva M. Brun, Marta Garcés-García, Estefanía Escuín, Sergi Morais, Rosa Puchades, and Ángel Maquieira

A new approach has been developed to determine diazinon in natural waters by immunoassay methods.

■ 1124

Ultrafiltration of Non-ionic Surfactants and Dissolved Organic Matter

Margit B. Müller, Wolfgang Fritz, Ulrich Lankes, and Fritz H. Frimmel

Ultrafiltration of model compounds demonstrates that site separation is affected by hydrophobic interactions that may also be relevant during ultrafiltration of amphiphilic dissolved organic matter.

1133

Use of Diffusive Gradients in Thin Films (DGT) in Undisturbed Field Soils

Bernd Nowack, Sandra Koehler, and Rainer Schulín

DGT can be successfully used in undisturbed field soils to determine the resupply kinetics of Cu and Zn, while plant metal concentrations were less accurately predicted.

■ 1139

Partitioning of Selected Estrogenic Compounds between Synthetic Membrane Vesicles and Water: Effects of Lipid Components

Hiroshi Yamamoto and Howard M. Lijstrand

Liposome/water partitioning coefficients are determined for steroid estrogens and estrogenic compounds with liposomes of varied lipid composition.

1148

Pollution-Induced Community Tolerance of Soil Microbial Communities Caused by the Antibiotic Sulfachloropyridazine

Heike Schmitt, Patrick van Beelen, Johannes Tolls, and Cornelis L. van Leeuwen

An assay based on different organic substrates in multiwell plates, in which soil was spiked with sulfachloropyridazine and bacterial communities showed increased tolerance to this antibiotic, demonstrates how sulfonamide antibiotics might affect the structure of soil bacterial communities.

1154

Use of Passive Samplers To Mimic Uptake of Polycyclic Aromatic Hydrocarbons by Benthic Polychaetes

Amy E. Vinturella, Robert M. Burgess, Brent A. Coull, Kimberly M. Thompson, and James P. Shine

Passive samplers made of low-density polyethylene can estimate the extent of uptake of polycyclic aromatic hydrocarbons by benthic polychaetes (*Nereis virens*) in contaminated marine sediments.

■ **1161**

Bilevel Thresholding of Sliced Image of Sludge Floc

C. P. Chu and D. J. Lee

A combined algorithm, including Otsu's and maximum convex perimeter methods, is recommended to determine the bilevel thresholding value of sludge floc's image.

Remediation and Control Technologies

1170

Surfactant-Enhanced Air Sparging in Saturated Sand

Heonki Kim, Hyo-Eun Soh, Michael D. Annable, and Dong-Jin Kim

The extent of air intrusion and air saturation during air sparging is investigated as a function of an applied surfactant.

1176

A Hierarchical Modeling Approach for Estimating National Distributions of Chemicals in Public Drinking Water Systems

Song S. Qian, Andrew Schulman, Jonathan Koplos, Alison Kotros, and Penny Kellar

A Bayesian hierarchical model was developed for supporting the U.S. EPA's Six-Year Review of Existing National Primary Drinking Water Regulations.

1183

Treatment of Saline Wastewater Contaminated with Hydrocarbons by the Photo-Fenton Process

José Ermírio F. Moraes, Frank H. Quina, Cláudio Augusto, O. Nascimento, Douglas N. Silva, and Osvaldo Chiavone-Filho

This work reveals the technical viability of the photochemically enhanced Fenton process in the treatment of wastewaters contaminated with hydrocarbons in a high-salinity medium.

■ **1188**

Remediation of Methyl Iodide in Aqueous Solution and Soils Amended with Thiourea

Wei Zheng, Sharon K. Papiernik, Mingxin Guo, and Scott R. Yates

Using thiourea, a nitrification inhibitor, as a chemical remediation reagent may abiotically transform the fumigant, MeI, in aqueous solution and soil and reduce fumigant atmosphere emission.

1195

Removal of Chlorophenols Using Industrial Wastes

Ajay K. Jain, Vinod K. Gupta, Shubhi Jain, and Suhas

A number of low-cost adsorbents prepared from industrial wastes are investigated and found suitable for the removal of phenols from aqueous solutions.

1201

Removal of PCDD/Fs from Flue Gas by a Fixed-Bed Activated Carbon Filter in a Hazardous Waste Incinerator

Aykan Karademir, Mithat Bakoglu, Fatih Taspinar, and Savas Ayberk

Removal of PCDD/F congeners and homologues by a fixed-bed activated carbon column in a hazardous waste incinerator is evaluated.

1208

Effects of Separate Urine Collection on Advanced Nutrient Removal Processes

J. A. Wilsenach and M. C. M. Van Loosdrecht

Urine separation decreases the total nitrogen effluent concentration, allows primary sedimentation without worsening denitrification, and increases the treatment capacity of existing advanced wastewater treatment plants.

1216

Approach to Highly Efficient Dechlorination of PCDDs, PCDFs, and Coplanar PCBs Using Metallic Calcium in Ethanol under Atmospheric Pressure at Room Temperature

Yoshiharu Mitoma, Taizo Uda, Naoyoshi Egashira, Cristian Simion, Hideki Tashiro, Masashi Tashiro, and Xiaobo Fan

With ethanol acting as both solvent and accelerator, nearly 100% detoxification of PCDDs, PCDFs, and coplanar PCBs can be achieved by stirring for 24 hours.

1221

Metribuzin Degradation by Membrane Anodic Fenton Treatment and Its Interaction with Ferric Ion

Qiquan Wang, Emily M. Scherer, and Ann T. Lemley

Weak interaction of metribuzin and several other triazine/triazinone herbicides with ferric ion greatly slows their degradation by hydroxyl radicals during membrane anodic Fenton treatment.

1228

Start-up of Autotrophic Nitrogen Removal Reactors via Sequential Biocatalyst Addition

Kris Pynaert, Barth F. Smets, Daan Beheydt, and Willy Verstraete

Sequential addition of nitrifying and anaerobic sludge to a bio-film reactor under controlled nitrogen load can bring about high nitrogen losses via oxygen-limited autotrophic nitrification-denitrification.

1236

Enhanced Reduction of Cr(VI) by Direct Electric Current in a Contaminated Clay

Sibel Pamukcu, Antoinette Weeks, and J. Kenneth Wittle

The influence of low-level direct electric current to enhance the in situ reduction of hexavalent chromium with ferrous iron is examined in kaolinite clay.

Sustainability Engineering and Green Chemistry

■ **1242**

Multilevel Cycle of Anthropogenic Copper

T. E. Graedel, D. van Beers, M. Bertram, K. Fuse, R. B. Gordon, A. Gritsinin, A. Kapur, R. J. Klee, R. J. Lifset, L. Memon, H. Rechberger, S. Spataro, and D. Vexler

Comprehensive extraction-to-discard cycles for copper are presented for 61 countries, 9 regions, and the planet.

■ **1253**

Exploratory Data Analysis of the Multilevel Anthropogenic Copper Cycle

T. E. Graedel, M. Bertram, A. Kapur, B. Reck, and S. Spataro

Statistical approaches are used to provide the first coordinated multi-level analysis of the stocks and flows of a material resource.

Correspondence and Rebuttal

1262

Comment on "Biomagnification Study on Organochlorine Compounds in Marine Aquaculture: The Sea Bass (*Dicentrarchus labrax*) as a Model"

V. Zitko

1263

Response to Comment on "Biomagnification Study on Organochlorine Compounds in Marine Aquaculture: The Sea Bass (*Dicentrarchus labrax*) as a Model"

Roque Serrano, Angela Simal-Julían, Elena Pitarch, Félix Hernández, Inmaculada Varó, and Juan C. Navarro

Additions and Corrections

1264

Perfluorooctanesulfonate and Related Fluorinated Hydrocarbons in Mink and River Otters from the United States.

Kurunthachalam Kannan, John Newsted, Richard S. Halbrook, and John P. Giesy

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