

February 1, 2005

ENVIRONMENTAL Science & Technology

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Hexachlorocyclohexanes *and* Endosulfans *in* AIR Samples: Evidence *for* Trans-Pacific Transport

Recovery of Acidified European Surface Waters

Feasibility of Reflectance Spectroscopy for
Assessing Soil Mercury Contamination

PUBLISHED BY
THE AMERICAN
CHEMICAL SOCIETY

Policy Analysis

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Framing the Elusive Concept of Sustainability: A Sustainability Hierarchy

Julian D. Marshall and Michael W. Toffel

This paper proposes a hierarchy to structure many of the broad concepts associated with sustainability.

■ 683

Choosing Chemicals for Precautionary Regulation: A Filter Series Approach

Ulrich Müller-Herold, Marco Morosini, and Olivier Schucht

In situations where the risk formula "probability times magnitude" cannot be applied, precautionary regulation offers a science-based insurance against ignorance.

Characterization of Natural and Affected Environments

692

Persistent Organic Pollutants in Two Dolphin Species with Focus on Toxaphene and Polybrominated Diphenyl Ethers

Karen J. S. Tuerk, John R. Kucklick, Paul R. Becker, Heather M. Stapleton, and Joel E. Baker

Brominated diphenyl ether congeners, toxaphene, and other persistent organic pollutants are examined in a temperate and a subtropical dolphin species.

699

Size and Composition of Airborne Particles from Pavement Wear, Tires, and Traction Sanding

Kaarle J. Kupiainen, Heikki Tervahattu, Mika Räisänen, Timo Mäkelä, Minna Aurela, and Risto Hillamo

Factors such as traction sanding and tire type that affect formation of abrasion components of springtime road dust are assessed.

707

Characterization of Organic Compounds Collected during Southeastern Aerosol and Visibility Study: Water-Soluble Organic Species

Liya E. Yu, Michelle L. Shulman, Royal Kopperud, and Lynn M. Hildemann

Water-soluble organic aerosols collected at a warm, humid, rural location show unique chemical compositions, distinctive day and night patterns, and significant photochemical processing.

716

Declining Threshold for Hypoxia in the Gulf of Mexico

Craig A. Stow, Song S. Qian, and J. Kevin Craig

A surface-bottom salinity difference threshold, where the probability of hypoxia increases from ~7.1% to 32.5%, has declined from 1982 to 2002.

724

Hexachlorocyclohexanes and Endosulfans in Urban, Rural, and High-Altitude Air Samples in the Fraser Valley, British Columbia: Evidence for Trans-Pacific Transport

Tom Harner, Mahiba Shoeib, Melissa Kozma, Frank A. P. C. Gobas, and Shao Meng Li

Events of trans-Pacific flow of α -HCH over the west coast of North America are demonstrated through aircraft sampling of mid-tropospheric air and back-trajectory analyses.

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Environmental Processes

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Biodegradability, DBP Formation, and Membrane Fouling Potential of Natural Organic Matter: Characterization and Controllability

Boksoon Kwon, Sangyoun Lee, Jaeweon Cho, Hyowon Ahn, Dongjoo Lee, and Heung Sup Shin

Colloidal NOM with molecular weight >3000 Da exhibits high biodegradability, disinfection byproducts/haloacetic acid formation potential, and membrane biofouling potential.

740

Temperature Dependence of Atmospheric PCB Concentrations

Daniel L. Carlson and Ronald A. Hites

The temperature dependence of atmospheric PCB concentrations cannot be used to distinguish sites dominated by long-distance transport from those with local sources.

■ 748

Biodegradation of 2,4,6-Tribromophenol during Transport in Fractured Chalk

Shai Arnon, Eilon Adar, Zeev Ronen, Ali Nejijat, Alexander Yakirevich, and Ronit Nativ

An experimental study demonstrates the potential use of organic contaminant biodegradation in low-permeability fractured rocks for in situ bioremediation.

■ 756

Influence of Amine Buffers on Carbon Tetrachloride Reductive Dechlorination by the Iron Oxide Magnetite

Karin M. Danielsen, John L. Gland, and Kim F. Hayes

The presence of amine buffers alters the rate constants and product yields in CCl_4 reductive dechlorination by magnetite.

764

Importance of Unburned Coal Carbon, Black Carbon, and Amorphous Organic Carbon to Phenanthrene Sorption in Sediments

Gerard Cornelissen and Örjan Gustafsson

Unburned coal can be an important sediment constituent with regard to PAH sorption in contaminated situations.

■ 770

Quantification of Abiotic Reaction Rates in Mine Tailings: Evaluation of Treatment Methods for Eliminating Iron- and Sulfur-Oxidizing Bacteria

Roger B. Herbert, Jr., Maria Malmström, Gustav Ebenå, Ursula Salmon, Embaie Ferrow, and Matthias Fuchs

Methods for eliminating iron- and sulfur-oxidizing bacteria in mine tailings are evaluated in terms of physical and chemical changes in the samples.

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Complexation of Heavy Metals by Phytochelatins: Voltammetric Study of the Binding of Cd²⁺ and Zn²⁺ Ions by the Phytochelatin (γ -Glu-Cys)₃Gly Assisted by Multivariate Curve Resolution

Boris H. Cruz, José Manuel Díaz-Cruz, Cristina Ariño, and Miquel Esteban

Voltammetry combined with multivariate analysis allows the study of Zn(II) and Cd(II) complexation by phytochelatins and the corresponding metal exchange equilibria.

787

Regional Assessment of the Response of the Acid-Base Status of Lake Watersheds in the Adirondack Region of New York to Changes in Atmospheric Deposition Using PnET-BGC

Limin Chen and Charles T. Driscoll

An integrated biogeochemical model is validated and then used to forecast the response of soil and surface waters to three future emission-control scenarios.

795

Effect of Nitrogen-Containing Compounds on Polychlorinated Dibenzo-*p*-dioxin/Dibenzofuran Formation through de Novo Synthesis

Shunsuke Kuzuhara, Hiroshi Sato, Naoto Tsubouchi, Yasuo Ohtsuka, and Eiki Kasai

The effect of urea coexisting with graphite powder and CuCl₂ on PCDD/F inhibition is studied through a de novo synthesis experiment; a new suppression pathway is proposed.

■ 800

Glass Transitions in Peat: Their Relevance and the Impact of Water

Gabriele E. Schaumann and Eugene J. LeBoeuf

Unexpected effects of drying and hydration point to structural relaxation and glass transition combined with antiplasticization as well as slow swelling in the peat matrix.

■ 807

Aggregation Kinetics of Kaolinite-Fulvic Acid Colloids as Affected by the Sorption of Cu and Pb

Ilona Heidmann, Iso Christl, and Ruben Kretzschmar

The influence of copper, lead, and calcium on the electrophoretic mobility and aggregation kinetics of kaolinite-fulvic acid colloids is investigated by dynamic light scattering.

814

Tropospheric Reaction of OH with Selected Linear Ketones: Kinetic Studies between 228 and 405 K

Elena Jiménez, Bernabé Ballesteros, Ernesto Martínez, and José Albaladejo

These studies aid in modeling the atmospheric chemistry of these ketones and their impact on air quality; the best fit is described by a three-parameter expression.

821

Oxidation of Ferrocyanide by Birnessite

Thilo Rennert, Andreas Pohlmeier, and Tim Mansfeldt

The reduced form of the iron-cyanide complexes is rapidly oxidized by birnessite, as revealed by both batch and stopped-flow experiments.

■ 826

Emissions of Metals Associated with Motor Vehicle Roadways

Glynn C. Lough, James J. Schauer, June-Soo Park, Martin M. Shafer, Jeffrey T. DeMinter, and Jason P. Weinstein

Emission factors are calculated from measurements of PM_{2.5} and PM₁₀ at tunnel entrances and exits, and effects of fleet composition and season are investigated.

Environmental Modeling

837

Exposure-Pathway Models Explain Causality in Whole-Sediment Toxicity Tests

Stuart L. Simpson and Catherine K. King

Measurements of lethal-effect concentrations and bioaccumulation following toxicity tests are combined with a bioenergetic-based kinetic model to explain causality in whole-sediment toxicity tests.

844

New Model Calculations of pH-Depending Tributyltin Adsorption onto Montmorillonite Surface and Montmorillonite-Rich Sediment

Marion Hoch and Rohan Weerasooriya

TBT adsorption to montmorillonite is calculated as a function of pH including ion exchange reaction and selective sites.

850

Numerical Model for Biological Fluidized-Bed Reactor Treatment of Perchlorate-Contaminated Groundwater

Perry L. McCarty and Travis E. Meyer

The 99.9% perchlorate removal obtained with a 12-min detention time by a full-scale BFBR is simulated with a biofilm numerical model.

■ 859

Risk Assessment of Short-Chain Chlorinated Paraffins in Japan Based on the First Market-Basket Study and Species Sensitivity Distributions

Fukuya Iino, Takumi Takasuga, Kurunthachalam Senthilkumar, Naoki Nakamura, and Junko Nakanishi

Chemical risk assessment of short-chain chlorinated paraffins was conducted.

Environmental Measurements Methods

867

Sediment Depth Attenuation of Biogenic Phosphorus Compounds Measured by ³¹P NMR

Joakim Ahlgren, Lars Tranvik, Adolf Gogoll, Monica Waldebäck, Karin Markides, and Emil Rydin

An investigation is presented concerning labile organic phosphorus compounds in freshwater sediments and their possible influence on eutrophication.

■ 873

Feasibility of Reflectance Spectroscopy for the Assessment of Soil Mercury Contamination

Yun Zhao Wu, Jun Chen, Jun Feng Ji, Qing Jiu Tian, and Xin Min Wu

The feasibility is explored of predicting mercury concentration in suburban agricultural soils with reflectance spectroscopy as a rapid and cost-effective method.

■ 879

Dissolved Organic Nitrogen Measurement Using Dialysis Pretreatment

Wontae Lee and Paul Westerhoff

A dialysis-based pretreatment approach is developed to reduce the interference from dissolved inorganic nitrogen to the quantification of dissolved organic nitrogen in water.

Remediation and Control Technologies

885

Adsorption onto Fluidized Powdered Activated Carbon Flocs—PACF

Ana Lúcia Serpa, Ivo André H. Schneider, and Jorge Rubio

Because the adsorption capacity of powdered activated carbon does not decrease after flocculation, the technique offers the advantage of simultaneous adsorption and solid/liquid separation.

889

Hydraulic Shear Stress Calculation in a Sequencing Batch Biofilm Reactor with Granular Biomass

C. Di Iaconi, R. Ramadori, A. Lopez, and R. Passino

A methodology for calculating hydrodynamic shear forces in a packed bed reactor is proposed and applied to evaluate the role of such forces during biomass granulation in an SBBR.

895

Development of a Biosorbent for Arsenite: Structural Modeling Based on X-ray Spectroscopy

Mônica Cristina Teixeira and Virgínia S. T. Ciminelli

The identification of a selective biomass for As(III) adsorption is described, as well as the adsorption structure determined by XAS analyses.

901

Sorption and Desorption of Perchlorate and U(VI) by Strong-Base Anion-Exchange Resins

Baohua Gu, Yee-Kyoung Ku, and Gilbert M. Brown

The sorption and desorption properties of uranium and perchlorate on various synthetic anion-exchange resins are investigated for waste segregation and minimization during water treatment.

Correspondence/Rebuttal

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Comment on "Atmospheric Mercury Accumulation Rates between 5900 and 800 Calibrated Years BP in the High Arctic of Canada Recorded by Peat Hummocks"

Richard Bindler, Antonio Martínez Cortizás, and Maarten Blaauw

■ **910**

Response to Comment on "Atmospheric Mercury Accumulation Rates between 5900 and 800 Calibrated Years BP in the High Arctic of Canada Recorded by Peat Hummocks,"

William Shotyk, Nicolas Givelet, Andriy K. Cheburkin, Mickael E. Goodsite, and Fiona Roos-Barraclough

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