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ENVIRONMENTAL Science & Technology

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Experimenting *with* **HYDROELECTRIC** **Reservoirs**

**Internal Metal Sequestration and
Its Ecotoxicological Relevance**

**Chemical and Biological Characterization
of Newly Discovered Iodoacid
Disinfection Byproducts**

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Critical Reviews

4705

Internal Metal Sequestration and Its Ecotoxicological Relevance: A Review

Martina G. Vijver, Cornelis A. M. van Gestel, Roman P. Lanno, Nico M. van Straalen, and Willie J. G. M. Peijnenburg

Internal metal compartmentalization determines toxicity and bioaccumulation patterns in aquatic and terrestrial organisms.

Characterization of Natural and Affected Environments

4713

Chemical and Biological Characterization of Newly Discovered Iodoacid Drinking Water Disinfection Byproducts

Michael J. Plewa, Elizabeth D. Wagner, Susan D. Richardson, Alfred D. Thruston, Jr., Yin-Tak Woo, and A. Bruce McKague

The chemical identifications of novel iodoacid DBPs are presented. The cytotoxicity and genotoxicity of iodoacetic acid is shown to be exceedingly high in mammalian cell assays.

4723

Effect of Storage on the Isotopic Composition of Nitrate in Bulk Precipitation

John Spoelstra, Sherry L. Schiff, Dean S. Jeffries, and Ray G. Semkin
Isotopic ratios ($^{18}\text{O}/^{16}\text{O}$ and $^{15}\text{N}/^{14}\text{N}$) of atmospheric nitrate collected unfiltered in bulk-deposition collectors are not altered during storage.

4728

Assessment of Sulfate Sources in High-Elevation Asian Precipitation Using Stable Sulfur Isotopes

Lee E. Pruett, Karl J. Kreutz, Moire Wadleigh, and Vladimir Aizen
Stable sulfur isotope measurements from snow samples are used for the first time to estimate the relative contributions of natural and anthropogenic sulfate in Asia.

4734

Polychlorinated Dibenzo-*p*-dioxin/Polychlorinated Dibenzofuran Releases into the Atmosphere from the Use of Secondary Fuels in Cement Kilns during Clinker Formation

Esteban Abad, Karell Martínez, Josep Caixach, and Josep Rivera
At three cement plants in Spain that use secondary fuels, polychlorinated dibenzo-*p*-dioxin/polychlorinated dibenzofuran emission values remain below the European Union Directive limit of 0.1 ng I-TEQ/Nm³.

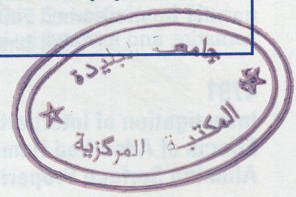
4739

Historical Records of Airborne Polycyclic Aromatic Hydrocarbons by Analyzing Dated Corks of the Bark Pocket in a Longpetiole Beech Tree

Qiuquan Wang, Yuli Zhao, Dong Yan, Limin Yang, Zhenji Li, and Benli Huang
In a novel method, historical levels of airborne PAH pollution in southeastern China from 1873 to 2003 were determined from the bark pocket of a tree.

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Environmental Processes

4745

pH Dependence of Carbon Tetrachloride Reductive Dechlorination by Magnetite

Karlin M. Danielsen and Kim F. Hayes

Carbon tetrachloride dechlorination rate constants, product distributions, and iron solubilities are quantified as a function of pH.

4753

Biocatalytic Synthesis of Polycatechols from Toxic Aromatic Compounds

Gary Ward, Rebecca E. Parales, and Carlos G. Dosoretz

Bacterial dihydroxylation of aromatic rings and subsequent polymerization of the catecholic derivatives formed by peroxidases is studied.

4758

XAS Study of Mercury(II) Ions Trapped in Mercaptan-Functionalized Mesostructured Silicate with a Wormhole Framework Structure

Chia-Chen Chen, Emily J. McKimmy, Thomas J. Pinnavaia, and Kim F. Hayes

To clarify previous inconsistent results, XAS studies are performed over a wider range of conditions to determine the complex Hg-S associations in mesoporous silicate structures.

4763

Aquatic Hypoxia Is a Teratogen and Affects Fish Embryonic Development

Eva H. H. Shang and Rudolf S. S. Wu

Apoptosis and embryonic development of fish are affected by aquatic hypoxia, which is a teratogen.

4768

Comparative Evaluation of Chloroethene Dechlorination to Ethene by *Dehalococcoides*-like Microorganisms

Alison M. Cupples, Alfred M. Spormann, and Perry L. McCarty
Dehalococcoides-like microorganisms in the Victoria, KB-1/VC, and Pinellas cultures reductively dehalogenate TCE to ethene with similar maximum growth rates for each step in the conversion.

4775

Pathway Dependent Isotopic Fractionation during Aerobic Biodegradation of 1,2-Dichloroethane

Sarah K. Hirschorn, M. Joyce Dinglasan, Martin Elsner, Silvia A. Mancini, Georges Lacrampe-Couloume, Elizabeth A. Edwards, and Barbara Sherwood Lollar

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

This issue contains a news story about this research.

Bimodal distribution of stable carbon isotope fractionation during aerobic biodegradation of 1,2-DCA is consistent with microbial degradation of 1,2-DCA by two separate enzymatic pathways.

4782 Spectroscopic Evidence for Fe(II)–Fe(III) Electron Transfer at the Iron Oxide–Water Interface

Aaron G. B. Williams and Michelle M. Scherer

⁵⁷Fe Mössbauer spectroscopy is used to demonstrate electron transfer from adsorbed Fe(II) to structural Fe(III) in goethite, hematite, and ferrihydrite in the absence of oxygen.

4791 Investigation of Interparticle Forces in Natural Waters: Effects of Adsorbed Humic Acids on Iron Oxide and Alumina Surface Properties

Sylvia Sander, Luke M. Mosley, and Keith A. Hunter

Suwannee River humic acid adsorbs strongly onto colloidal particles of iron or aluminum oxide and subsequently dominates the surface forces acting between particles.

4797 Insights into the Chemistry of New Particle Formation and Growth Events in Pittsburgh Based on Aerosol Mass Spectrometry

Qi Zhang, Charles O. Stanier, Manjula R. Canagaratna, John T. Jayne, Douglas R. Worsnop, Spyros N. Pandis, and Jose L. Jimenez

The chemistry of particles during the growth phase of frequently observed nucleation events is investigated, including temporal variations, species dynamics, and mechanisms of particle growth.

Environmental Modeling

4810 Thermodynamic Accounting of Ecosystem Contribution to Economic Sectors with Application to 1992 U.S. Economy

Nandan U. Ukidwe and Bhavik R. Bakshi

A novel thermodynamic approach is developed for ecologically conscious decision making to enable sustainability at macro- and micro-levels.

Environmental Measurements Methods

4828 Passive Air Sampling Using Semipermeable Membrane Devices at Different Wind-Speeds in Situ Calibrated by Performance Reference Compounds

Hanna S. Söderström and Per-Anders Bergqvist

A wind effect on the SPMD sampling rate is observed, and the ability of PRCs to compensate for the site effects of wind is tested.

4835 Detecting *N*-Nitrosamines in Drinking Water at Nanogram per Liter Levels Using Ammonia Positive Chemical Ionization

Jeffrey W. A. Charrois, Markus W. Arend, Kenneth L. Froese, and Steve E. Hrudey

A solid-phase extraction technique combined with GC/MS ammonia positive chemical ionization is applied to authentic drinking-water samples, detecting *N*-nitrosodimethylamine as well as two other *N*-nitrosamines.

4842 Solid-Phase Microextraction To Predict Bioavailability and Accumulation of Organic Micropollutants in Terrestrial Organisms after Exposure to a Field-Contaminated Soil

Leon van der Wal, Tjalling Jager, Roel H. L. J. Fleuren, Arjan Barendregt, Theo L. Sinnige, Cornelis A. M. van Gestel, and Joop L. M. Hermens

Solid-phase microextraction mimics uptake of very hydrophobic contaminants in different earthworm species, making it a good predictive tool for site-specific risk assessment.

4849 Analysis of Triclocarban in Aquatic Samples by Liquid Chromatography Electrospray Ionization Mass Spectrometry

Rolf U. Halden and Daniel H. Paull

LC/ESI-MS was used to identify the disinfectant triclocarban as a frequent, but underreported, toxic contaminant of wastewater and urban streams.

Remediation and Control Technologies

4856 Mechanisms and Inorganic Byproducts of Trihalomethane Compounds Sonodegradation

Hilla Shemer and Nava Narkis

The mechanisms and inorganic byproducts formation of the ultrasonic degradation of different trihalomethanes (CHCl₃, CHBrCl₂, CHBr₂Cl, CHBr₃, and CHI₃) are studied.

4860 Reduction of Hexavalent Chromium with the Brown Seaweed *Ecklonia* Biomass

Donghee Park, Yeoung-Sang Yun, and Jong Moon Park

Mechanism of removal of hexavalent chromium with seaweed biomass is the reduction of Cr(VI) to Cr(III) followed by the sorption of reduced Cr(III).

4865 Activated Carbon Fiber Cloth Electrothermal Swing Adsorption System

Patrick D. Sullivan, Mark J. Rood, Georges Grevillot, Joseph D. Wander, and K. James Hay

A bench-scale activated carbon cloth system, with electrothermal desorption and in-vessel condensation is presented with performance and modeling results.

4878 Removal of Industrial Cutting Oil from Oil Emulsions by Polymeric Ultra- and Microfiltration Membranes

Peter Janknecht, Ana D. Lopes, and Adélio M. Mendes

Results of a study of micro- and ultrafiltration of oil emulsion with polymeric membranes of different membrane materials and pore sizes are correlated with membranes' capillary pressures.

4884 Nucleation Mode Formation in Heavy-Duty Diesel Exhaust with and without a Particulate Filter

Kati Vaaraslahti, Annele Virtanen, Jyrki Ristimäki, and Jorma Keskinen

Direct tailpipe emission sampling is used to study the effect of a continuously regenerating diesel particulate filter that consists of an oxidation catalyst and a filter.

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

4891

Evaluation of a Biologically Active Cover for Mitigation of Landfill Gas Emissions

M. A. Barlaz, R. B. Green, J. P. Chanton, C. D. Goldsmith, and G. R. Hater
Emissions of methane and nonmethane organic compounds from landfill cells covered with soil or a biologically active cover consisting of yard waste compost are compared.

Sustainability Engineering and Green Chemistry

4900

Cathode Performance as a Factor in Electricity Generation in Microbial Fuel Cells

SangEun Oh, Booki Min, and Bruce E. Logan

The relative sizes of the anode and cathode are shown to affect power density in a microbial fuel cell with an aqueous cathode.

4905

Natural Polysaccharides and Their Interactions with Dye Molecules: Applications in Effluent Treatment

Richard S. Blackburn

Galactomannans are highly effective in removing dye from effluent; this is attributed to low inter- and intramolecular interactions between separate polymer chains, which allow molecular recognition with dye molecules.

Correspondence/Rebuttal

4910

Comment on "Geographic Sensitivity of Fine Particle Mass to Emissions of SO₂ and NO_x"

James W. Boylan and Mehmet T. Odman

4911

Response to Comment on "Geographic Sensitivity of Fine Particle Mass to Emissions of SO₂ and NO_x"

S. F. Mueller, E. M. Bailey, and J. J. Kelsoe

Additions and Corrections

4912

Fugacity-Based Indoor Residential Pesticide Fate Model

Deborah H. Bennett and Edwin J. Furtaw, Jr.



ES&T salutes
Professor Walter J. Weber, Jr.

Coming November 15