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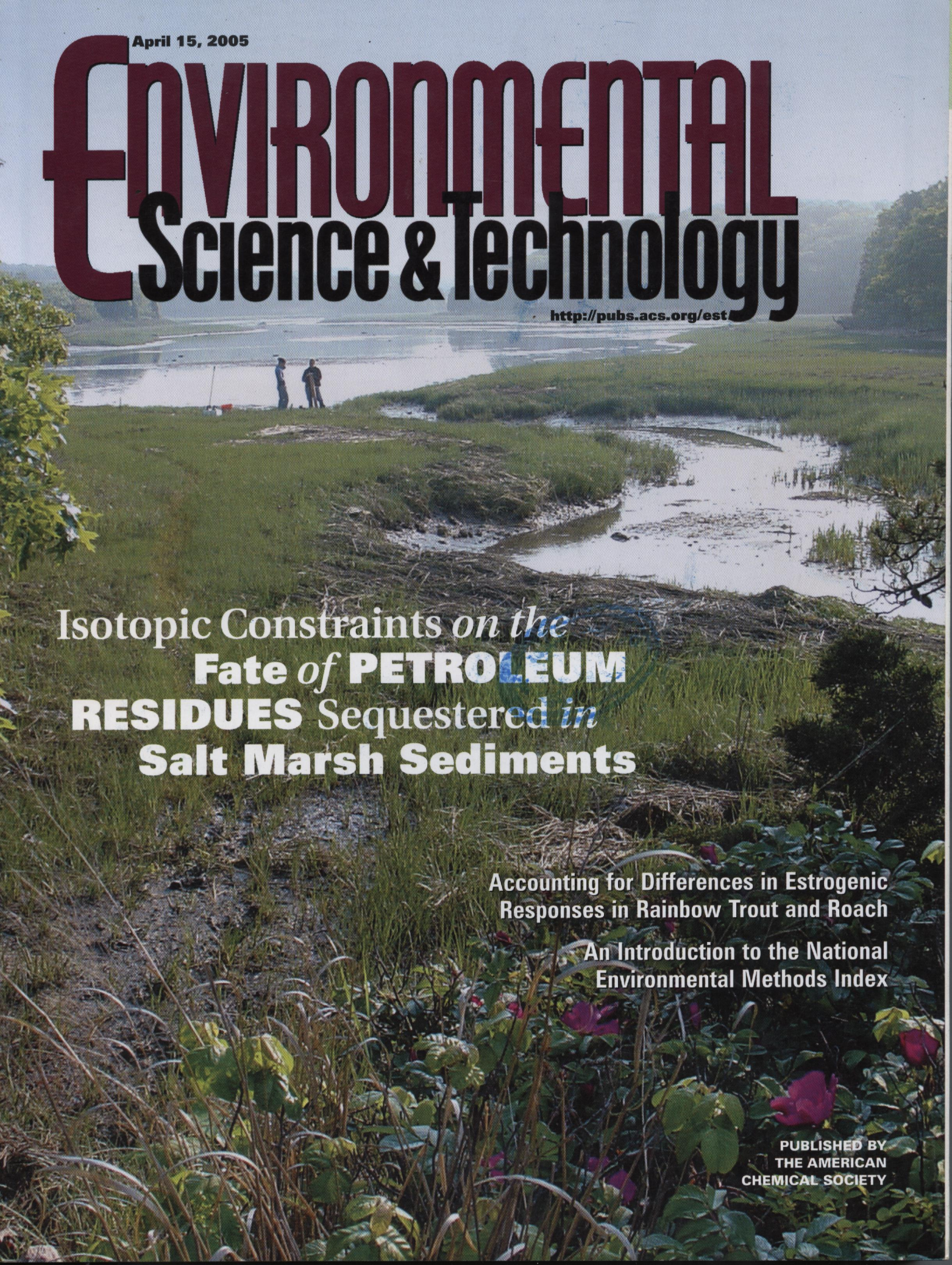

Isotopic Constraints *on the* Fate *of* PETROLEUM RESIDUES Sequestered *in* Salt Marsh Sediments

Accounting for Differences in Estrogenic Responses in Rainbow Trout and Roach

An Introduction to the National Environmental Methods Index

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Environmental Processes

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■ 2515

Low Molecular Weight Carboxylic Acids in Oxidizing Porphyry Copper Tailings

Bernhard Dold, David W. Blowes, Ralph Dickhout, Jorge E. Spangenberg, and Hans-Rudolf Pfeifer

Metabolic byproducts of bacterial activity in porphyry copper mine tailings trigger Fe(III) reduction and increase iron mobility through low-molecular-weight carboxylic acids and Fe(III)–Fe(II) cycling.

■ 2522

Quantifying the Contribution of Different Sorption Mechanisms for 2,4-Dichlorophenoxyacetic Acid Sorption by Several Variable-Charge Soils

Seunghun Hyun and Linda S. Lee

Hydrophilic 2,4-D sorption by variable-charge soils is mainly determined by anion exchange and calcium bridging.

2529

Role for Fe(III) Minerals in Nitrate-Dependent Microbial U(IV) Oxidation

John M. Senko, Yasser Mohamed, Thomas A. Dewers, and Lee R. Krumholz

Nitrate-dependent U(IV) oxidation is mediated by iron and dependent on Fe(III) mineralogy.

2537

Arsenate Adsorption Mechanisms at the Allophane–Water Interface

Yuji Arai, D. L. Sparks, and J. A. Davis

Arsenate readily adsorbs on allophane via ligand exchange mechanisms, and the inner-sphere bidentate, binuclear surface species on aluminum octahedral structures persist with increasing residence time.

2545

Isotopic Constraints on the Fate of Petroleum Residues Sequestered in Salt Marsh Sediments

Helen K. White, Christopher M. Reddy, and Timothy I. Eglinton

Naturally abundant radiocarbon is an inverse tracer of fossil-fuel-derived carbon in marine sediments.

2552

Determination of Microbial Carbon Sources in Petroleum Contaminated Sediments Using Molecular ^{14}C Analysis

Gregory F. Slater, Helen K. White, Timothy I. Eglinton, and Christopher M. Reddy

^{14}C analysis of individual phospholipid fatty acids reveals that microbial metabolism of petroleum residues in contaminated marsh sediments is insignificant.

2559

Vehicle Self-Pollution Intake Fraction: Children's Exposure to School Bus Emissions

Julian D. Marshall and Eduardo Behrentz

Inhalation intake of emissions is much lower if reductions come from a school bus compared with other types of vehicles.

2564

Decrease in Net Mercury Methylation Rates Following Iron Amendment to Anoxic Wetland Sediment Slurries

Anna S. Mehrotra and David L. Sedlak

Decreases in net mercury methylation in estuarine wetland sediment slurries following iron(II) addition suggest that iron addition might be a viable strategy for minimizing mercury methylation in engineered wetland sediments.

2571

Polycyclic Aromatic Hydrocarbon Biodegradation Rates: A Structure-Based Study

Kristine H. Wammer and Catherine A. Peters

Biodegradation rates for 22 2–4-ring PAHs are measured, and their molecular structure is examined.

2579

Oxidation of Fe(II) in Rainwater

J. D. Willey, R. F. Whitehead, R. J. Kieber, and D. R. Hardison

Photochemically produced Fe(II) in rain can be oxidized by hydrogen peroxide within hours; however, other forms of Fe(II) in rain are much more stable.

2586

Mechanism of Interactions between Hg(II) and Demeton S: An NMR Study

Simo O. Pehkonen and Zaher M. A. Judeh

^{1}H and ^{31}P NMR spectroscopy is used in the first in situ study of the molecular interactions between an aqueous solution of Hg(II) and Demeton S, an organophosphorus pesticide.

2592

Effects of pH and Cationic and Nonionic Surfactants on the Adsorption of Pharmaceuticals to a Natural Aquifer Material

Ajai C. Hari, Rajiv A. Paruchuri, David A. Sabatini, and Tohren C. G. Kibbey

Batch adsorption experiments are used to examine the effects of pH and surfactants on the adsorption behavior of four pharmaceutical compounds.

2599

Accounting for Differences in Estrogenic Responses in Rainbow Trout (*Oncorhynchus mykiss*: Salmonidae) and Roach (*Rutilus rutilus*: Cyprinidae) Exposed to Effluents from Wastewater Treatment Works

C. R. Tyler, C. Spary, R. Gibson, E. M. Santos, J. Shears, and E. M. Hill

Fish species show differences in their responsiveness to estrogenic effluents from wastewater treatment works.

2608

Interfacial Interactions between Np(V) and Manganese Oxide Minerals Manganite and Hausmannite

P. A. Wilk, D. A. Shaughnessy, R. E. Wilson, and H. Nitsche

Manganese minerals manganite and hausmannite sorb pentavalent plutonium, but problems arise in characterizing the sorbed species by XAS because of high beam intensities.

2616

Enzymatic versus Nonenzymatic Conversions during the Reduction of EDTA-Chelated Fe(III) in BioDeNO$_x$ Reactors

Peter van der Maas, Shen Peng, Bram Klapwijk, and Piet Lens

Biological reduction of EDTA-chelated Fe(III), a core reaction in BioDeNO$_x$ reactors, is mediated by an electron-shuttling compound, presumably polysulfide.

2624

Cell-Membrane Damage and Element Leaching in Transplanted *Parmelia sulcata* Lichen Related to Ambient SO_2, Temperature, and Precipitation

Ana P. Marques, Maria C. Freitas, Hubert T. Wolterbeek, Olav M. Steinebach, Tona Verburg, and Jeroen J. M. De Goeij

Lichen vitality in large geographical areas may be governed by the area's variability in temperature and precipitation rather than by variability in metal deposition rates.

2631
Reductive Dechlorination of Tetrachloroethene to *trans*-Dichloroethene and *cis*-Dichloroethene by PCB-Dechlorinating Bacterium DF-1
Gregory S. Miller, Charles E. Milliken, Kevin R. Sowers, and Harold D. May

PCB-dechlorinating bacterium DF-1 dechlorinates PCE and TCE to *trans*- and *cis*-DCE.

2636
Settling Behavior of Unpurified *Cryptosporidium* Oocysts in Laboratory Settling Columns
Pamela L. Young and Simeon J. Komisar

Settling velocity of unpurified *Cryptosporidium* oocysts in columns ranges from 0.22 to 1.78 μm/s.

■ **2645**
Reduction of Organically Complexed Ferric Iron by Superoxide in a Simulated Natural Water
Andrew L. Rose and T. David Waite

Superoxide is an effective reductant of ferric iron complexed to natural organic matter in seawater; this process could increase iron bioavailability.

2651
Cryogenic Laser Induced U(VI) Fluorescence Studies of a U(VI) Substituted Natural Calcite: Implications to U(VI) Speciation in Contaminated Hanford Sediments
Zheming Wang, John M. Zachara, James P. McKinley, and Steven C. Smith

Time-resolved laser-induced fluorescence spectroscopy and imaging spectromicroscopy studies indicate the presence of U(VI)-incorporated aragonite and calcite in both natural calcite and uranium-contaminated Hanford sediments.

■ **2660**
Interaction of Tetracycline with Aluminum and Iron Hydrous Oxides
Cheng Gu and K. G. Karthikeyan

The role of aluminum and iron hydrous oxides in influencing the environmental reactivity of tetracycline, a widely used antibiotic compound, is reported.

2668
Secondary Organic Aerosol Formation by Irradiation of 1,3,5-Trimethylbenzene–NO_x–H_2O in a New Reaction Chamber for Atmospheric Chemistry and Physics
Dwane Paulsen, Josef Dommen, Markus Kalberer, André S. H. Prévôt, René Richter, Mirjam Sax, Martin Steinbacher, Ernest Weingartner, and Urs Baltensperger

A fluorinated, ethylene–propylene bag suspended in a temperature-controlled enclosure with four xenon arc lamps is used to irradiate primary gas components.

■ **2679**
Characterization of Adsorption Sites on Aggregate Soil Samples Using Synchrotron X-ray Computerized Microtomography
Susan J. Altman, Mark L. Rivers, Marissa D. Reno, Randall T. Cygan, and Angela A. McLain

CMT is used to determine the relative amounts of iron oxyhydroxides and iron-bearing clays and to delineate the relationship of cesium adsorption with iron-bearing materials within soil aggregate samples.

2686
Some Sources and Sinks of Monomethyl and Inorganic Mercury on Ellesmere Island in the Canadian High Arctic
Vincent L. St. Louis, Martin J. Sharp, Alexandra Steffen, Al May, Joel Barkér, Jane L. Kirk, David J. A. Kelly, Shelley E. Arnott, Bronwyn Keatley, and John P. Smol

Atmospheric mercury depletion events result in little net mercury deposition to Arctic snowpacks, whereas northern oceans may be an ultimate source of methylmercury to snowpacks.

Environmental Modeling

■ **2702**
Estimating Partition Coefficients for Fuel–Water Systems: Developing Linear Solvation Energy Relationships Using Linear Solvent Strength Theory To Handle Mixtures
J. Samuel Arey and Philip M. Gschwend

LSST is used to combine existing solvent–water LSERs; this allows good estimates of fuel–water mixtures partitioning to be made for both polar and nonpolar solutes.

■ **2711**
Five-Stage Environmental Exposure Assessment Strategy for Mixtures: Gasoline as a Case Study
Karen L. Foster, Don Mackay, Thomas F. Parkerton, Eva Webster, and Lynne Milford

An exposure assessment strategy for mixtures is presented and illustrated by application to gasoline hydrocarbons.

■ **2719**
Halogen Substitution Patterns among Disinfection Byproducts in the Information Collection Rule Database
Alexa Obolensky and Philip C. Singer

Multivariate analysis and a new DBP halogen substitution metric are used to demonstrate strong interclass correlations in bromine substitution, and these are applied to quality assurance.

2731
Determination of the Fractal Dimension of Microbial Flocs from the Change in Their Size Distribution after Breakage
Xiao-yan Li and Ruby P. C. Leung

The fractal dimension of activated sludge flocs can be determined from the change in their particle size distribution brought about by enhanced breakage.

■ **2736**
Degradation of Biological Weapons Agents in the Environment: Implications for Terrorism Response
Amy L. Stuart and Dean A. Wilkening

Degradation of biological weapons agents in the environment is reviewed and modeled to determine impacts on terrorism response and response planning.

Environmental Measurements Methods

2744
Partition of Endocrine-Disrupting Chemicals between Colloids and Dissolved Phase as Determined by Cross-Flow Ultrafiltration
Ruixia Liu, Andrew Wilding, Andrew Hibberd, and John L. Zhou

Dynamic sorption of endocrine-disrupting chemicals by river colloids is determined by cross-flow ultrafiltration coupled with GC/MS.

2753
New Analytical Method for the Determination of Levoglucosan, Polyhydroxy Compounds, and 2-Methylerythritol and Its Application to Smoke and Rainwater Samples
G. Schkolnik, A. H. Falkovich, Y. Rudich, W. Maenhaut, and P. Artaxo

With water extraction and ion-exclusion HPLC detection at 194 nm, the method broadens the speciation possibilities offered by simple HPLC.

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Remediation and Control Technologies

Mixing activated carbon into contaminated sediment is a new, in situ treatment method that reduces the biouptake of PCBs by benthic organisms.

2888

Laboratory Study of Treatment of Trichloroethene by Chemical Oxidation Followed by Bioremediation

Leila Hrapovic, Brent E. Sleep, David J. Major, and Eric D. Hood

Column studies with soils and emplaced TCE sources demonstrate the feasibility of remediation of TCE source zones with permanganate flushing followed by biostimulation and bioaugmentation.

2898

Assessment of the Energy Dissipation Parameters Inside the Draft Tube of a Liquid Spout-Fluid Bed

Ayşe Çeçen Erbil and Mustafa Turan

A theoretical model assesses the possibility of applying draft tubes in filter backwashing by calculating the energy dissipation parameters inside a draft tube.

2906

Electrodialytic Removal of Cu, Zn, Pb, and Cd from Harbor Sediment: Influence of Changing Experimental Conditions

Gunvor M. Nystroem, Lisbeth M. Ottosen, and Arne Villumsen

An electric field is applied to stirred sediment suspensions to remove heavy metals from contaminated harbor sediments.

Additions and Corrections

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Storm Disturbance of Sediment Contaminants at a Hot-Spot in the Baltic Sea Assessed by ^{234}Th Radionuclide Tracer Profiles

Michael Kersten, Thomas Leipe, and Franz Tauber

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▶ **This issue contains a news story about this research.**