January 1, 2004

# Science & Technology

Reducing Children's Risk from LEAD in Soil

**New Research Challenges Assumptions About Deca Flame Retardant** 

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Identification of Hydroxylated and Methoxylated Polybrominated Diphenyl Ethers in Baltic Sea Salmon (Salmo salar) Blood

Göran Marsh, Maria Athanasiadou, Åke Bergman, and Lillemor Asplund Gas chromatography and mass spectrometry are used to identify hydroxylated and methoxylated polybrominated diphenyl ethers in Baltic salmon by comparing them to authentic reference compounds.

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Estimate of Oil Persisting on the Beaches of Prince William Sound 12 Years after the *Exxon Valdez* Oil Spill

Jeffrey W. Short, Mandy R. Lindeberg, Patricia M. Harris, Jacek M. Maselko, Jerome J. Pella, and Stanley D. Rice

Oil from the Exxon Valdez spill is more persistent than anticipated and remains by far the largest reservoir of biologically available PAH on impacted beaches.

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The Significance of the North Atlantic Oscillation (NAO) for Sea-Salt Episodes and Acidification-Related Effects in Norwegian Rivers

Atle Hindar, Kjetil Torseth, Arne Henriksen, and Yvan Orsolini
The North Atlantic Oscillation (NAO) is correlated to sea-salt deposition and sea-salt-induced water quality reduction in Atlantic
salmon rivers in Norway.

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Passive Air Sampling of PCBs, PBDEs, and Organochlorine Pesticides Across Europe

Foday M. Jaward, Nick J. Farrar, Tom Harner, Andrew J. Sweetman, and Kevin C. Jones

Passive air samplers deployed across Europe highlight regional sources and compound fate differences for POPs.

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Evaluation of the Impact of Fuel Hydrocarbons and Oxygenates on Groundwater Resources

Tom Shih, Yue Rong, Thomas Harmon, and Mel Suffet Evaluation of the occurrence, distribution, and spatial extent of fuel hydrocarbons and oxygenates in groundwater beneath leaking underground fuel tank facilities provides preliminary indications of their potential to contaminate groundwater resources.

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Spatial Distributions and Profiles of Atmospheric
Polycyclic Aromatic Hydrocarbons in Two Industrial Cities
in Japan

Takeshi Ohura, Takashi Amagai, Masahiro Fusaya, and Hidetsuru Matsushita

Spatial distribution and profiles of PAHs in two industrial cities in Japan are investigated. Atmospheric PAHs are dominated by traffic and stationary sources.

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Urinary 1-Hydroxypyrene as an Indicator for Assessing the Exposures of Booth Attendants of a Highway Toll Station to Polycyclic Aromatic Hydrocarbons

Perng-Jy Tsai, Tung-Sheng Shih, Hsiao-Lung Chen, Wen-Jhy Lee, Ching-Huang Lai, and Saou-Hsing Liou Urinary 1-hydroxypyrene is feasible for assessing booth attendants' PAH exposures and can be characterized by the vehicle densities and vehicle types involved.

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Halonitromethane Drinking Water Disinfection Byproducts: Chemical Characterization and Mammalian Cell Cytotoxicity and Genotoxicity

Michael J. Plewa, Elizabeth D. Wagner, Paulina Jazwierska, Susan D. Richardson, Paul H. Chen, and A. Bruce McKague Halonitromethanes, a U.S. EPA-defined high-priority class of drinking water disinfection byproducts, are potent mammalian cell cytotoxins and genotoxins.

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Chasing Quicksilver: Modeling the Atmospheric Lifetime of Hg<sup>0</sup> (g) in the Marine Boundary Layer at Various Latitudes

Ian M. Hedgecock and Nicola Pirrone

Under typical summer conditions in the MBL, the calculated lifetime of  $Hg^0(g)$  is around 10 days at 0– $60^\circ$  N, much shorter than the generally accepted atmospheric residence time.

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Polycyclic Aromatic Hydrocarbons in Indoor and Outdoor Environments and Factors Affecting Their Concentrations

Takeshi Ohura, Takashi Amagai, Masahiro Fusaya, and Hidetsuru Matsushita

A highly sensitive analytical method for gaseous and particulate PAHs in indoor and outdoor air is established, and possible sources are identified.

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Organochlorine Compounds in Lake Superior: Chiral Polychlorinated Biphenyls and Biotransformation in the Aquatic Food Web

Charles S. Wong, Scott A. Mabury, D. Michael Whittle, Sean M. Backus, Camilla Teixeira, David S. DeVault, Charles R. Bronte, and Derek C. G. Muir

Chiral PCB signatures are quantified in the Lake Superior aquatic food web and used to probe the biotransformation of PCBs by aquatic biota.

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► Higher Brominated Diphenyl Ethers and Hexabromocyclododecane Found in Eggs of Peregrine Falcons (Falco peregrinus) Breeding in Sweden

Peter Lindberg, Ulla Sellström, Lisbeth Häggberg, and Cynthia A. de Wit BDEs-47, -99, -100, -153, -154, -183, and -209; BB-153; and HBCD were found in much higher concentrations in wild peregrine falcon eggs in Sweden than in those from a captive breeding population.

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Source Apportionment of Sediment PAHs in Lake Calumet, Chicago: Application of Factor Analysis with Nonnegative Constraints

Philip A. Bzdusek, Erik R. Christensen, An Li, and Qimeng Zou A factor analysis model with nonnegative constraints successfully apportions PAH sources for Lake Calumet, Ill., and supports a previous CMB modeling study.

#### **Environmental Processes**

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Bacterial Populations Associated with the Oxidation and Reduction of Arsenic in an Unsaturated Soil

Richard E. Macur, Colin R. Jackson, Lina M. Botero, Timothy R. McDermott and William P. Inskeep

Molecular and cultivation methods reveal that members of a soil microbial community can mediate As redox cycling for purposes other than direct energy metabolism.

- Supporting Information is available free of charge via the Internet at http://pubs.acs.org.
- This issue contains a news story about this research.

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#### ► Debromination of the Flame Retardant Decabromodiphenyl Ether by Juvenile Carp (*Cyprinus carpio*) following Dietary Exposure

Heather M. Stapleton, Mehran Alaee, Robert J. Letcher, and Joel E. Baker Juvenile carp fed worms spiked with the flame retardant decabromodiphenyl ether accumulate lower brominated products, likely because of debromination reactions in the carp gut.

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#### Adsorption of Natural Organic Matter to Air–Water Interfaces during Transport through Unsaturated Porous Media

John J. Lenhart and James E. Saiers

Experimental and modeling results suggest that sorptive reactions with air—water interfaces play an important role in the transport of natural organic matter through the vadose zone.

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Gunilla Söderström, Ulla Sellström, Cynthia A. de Wit, and Mats Tysklind

DecaBDE degrades to lower brominated PBDEs and PBDFs when exposed to artificial UV light or sunlight.

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## Evolution of Toxicity upon Wet Catalytic Oxidation of Phenol

A. Santos, P. Yustos, A. Quintanilla, F. García-Ochoa, J. A. Casas, and J. J. Rodríguez

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Rosemarie Miehr, Paul G. Tratnyek, Joel Z. Bandstra, Michelle M. Scherer, Michael J. Alowitz, and Eric J. Bylaska A survey of eight contaminants and nine types of iron metal provides a uniquely broad perspective on their reactivity.

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## Sorption of Phenanthrene to Environmental Black Carbon in Sediment with and without Organic Matter and Native Sorbates

Gerard Cornelissen and Örjan Gustafsson

Native sorbates and natural organic matter attenuate the sorption strength of soot- and charcoal-like materials in a polluted Rhine River sediment.

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#### Understanding the Effects of Soil Characteristics on Phytotoxicity and Bioavailability of Nickel Using Speciation Models

Li Ping Weng, Anke Wolthoorn, Theo M. Lexmond, Erwin J. M. Temminghoff, and Willem H. van Riemsdijk

Agreeing with experimental findings, a multisurface speciation model indicates that soil organic matter binds nickel more strongly than clay silicates and iron hydroxides and oxides at acid pH.

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Dharni Vasudevan and Ellen M. Cooper

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#### Influence of Dissolved Sodium and Cesium on Uranyl Oxide Hydrate Solubility

Daniel E. Giammar and Janet G. Hering

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## Adsorption of the Herbicide Simazine by Montmorillonite Modified with Natural Organic Cations

Marta Cruz-Guzmán, Rafael Celis, M. Carmen Hermosín, and Juan Cornejo

Modification of smectitic clay minerals with natural organic cations containing appropriate functional groups can be used to create an interlayer microenvironment with enhanced affinity for selected organic pollutants.

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## Inhibition of Biological Reductive Dissolution of Hematite by Ferrous Iron

Richard A. Royer, Brian A. Dempsey, Byong-Hun Jeon, and William D. Burgos

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#### Dissipation of Fragrance Materials in Sludge-Amended Soils

Angela M. DiFrancesco, Pei C. Chiu, Laurel J. Standley,

Herbert E. Allen, and Daniel T. Salvito

Fragrance materials in four soils receiving anaerobically digested wastewater sludge are dissipated at highly variable rates and through different fate processes.

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#### Analysis of Ambient Particle Size Distributions Using Unmix and Positive Matrix Factorization

Eugene Kim, Philip K. Hopke, Timothy V. Larson, and David S. Covert Applying positive matrix factorization to particle size distribution data demonstrates that such data can provide source identification and apportionment.

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# Deposition and Reentrainment of Brownian Particles in Porous Media under Unfavorable Chemical Conditions: Some Concepts and Applications

Melinda W. Hahn and Charles R. O'Melia

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W. C. Kuster, B. T. Jobson, T. Karl, D. Riemer, E. Apel, P. D. Goldan, and F. C. Fehsenfeld

Measurements from four in situ VOC instruments operated at La Porte, TX, during the Texas Air Quality Study 2000 (TexAQS2000) are correlated.

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## Identification of the Non-Pertechnetate Species in Hanford Waste Tanks, Tc(I)-Carbonyl Complexes

Wayne W. Lukens, David K. Shuh, Norman C. Schroeder, and Kenneth R. Ashley

The soluble technetium species that have caused problems for the remediation of high-level nuclear waste at Hanford are most likely Tc(I)-carbonyl complexes.

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#### Field Screening of Waterborne Petroleum Hydrocarbons by Thickness Shear-Mode Resonator Measurements

Michelle S. Applebee, John D. Geissler, Adam P. Schellinger, Richard J. Jaeger, and David T. Pierce

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#### Methods for Estimating Adsorbed Uranium(VI) and Distribution Coefficients of Contaminated Sediments

Matthias Kohler, Gary P. Curtis, David E. Meece, and James A. Davis In situ KD values calculated from the measured labile U(VI) agree within a factor of 3 with values predicted with the NEM and groundwater chemistry.

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Clifford Watson, Joan McCraw, Gregory Polzin, and David Ashley Solanesol trapped in a cigarette filter butt during smoking is shown to be a potentially useful marker for tar and nicotine delivery.

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#### Sampling Artifacts of Acidity and Ionic Species in PM2.5

Ravi Kant Pathak, Xiaohong Yao, and Chak K. Chan

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#### Synergistic Effect of Copper Ion on the Reductive Dechlorination of Carbon Tetrachloride by Surface-Bound Fe(II) Associated with Goethite

R. A. Maithreepala and Ruey-an Doong

Fe(II) serves as the bulk reductant to reduce both carbon tetrachloride and Cu(II); the Cu(I) then accelerates the dechlorination rate of chlorinated hydrocarbons.

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#### Novel Bentonite Clay-Based Fe Nanocomposite as a Heterogeneous Catalyst for Photo-Fenton Discoloration and Mineralization of Orange II

Jiyun Feng, Xijun Hu, and Po Lock Yue

A novel bentonite clay-based Fe nanocomposite is developed as a heterogeneous catalyst for photo-Fenton degradation of Orange II.

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#### Enhancing Activated Carbon Adsorption of 2-Methylisoborneol: Methane and Steam Treatments

Kirk O. Nowack, Fred S. Cannon, and David W. Mazyck

A commercial, lignite-based activated carbon underwent various heat treatments in an effort to improve its MIB adsorption capacity.

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Hisahiro Einaga, Takashi Ibusuki, and Shigeru Futamura The durability of  ${
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Craig L. Just and Jerald L. Schnoor

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## Photoproduction of Hydroxyl Radicals in Aqueous Solution with Algae under High-Pressure Mercury Lamp

Xianli Liu, Feng Wu, and Nansheng Deng Photoproduction of hydroxyl radicals could be induced in aqueous solution with algae with or without Fe(III) under a high-pressure mercury lamp.

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#### Bioaccumulation of Chromium from Tannery Wastewater: An Approach for Chrome Recovery and Reuse

Rathinam Aravindhan, Balaraman Madhan, Jonnalagadda Raghava Rao, Balachandran Unni Nair, and Thirumalachari Ramasami Treatment of chromium-containing tannery wastewaters using seaweed and its reuse is examined.

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#### Arsenic Removal with Iron(II) and Iron(III) in Waters with High Silicate and Phosphate Concentrations

Linda C. Roberts, Stephan J. Hug, Thomas Ruettimann, Md Morsaline Billah, Abdul Wahab Khan, and Mohammad Tariqur Rahman Less Fe(II) than Fe(III) is required to remove As(III) from aerated water with competing anions because of the formation of As(V) and precipitates with higher sorption capacities.

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## Influence of Surface Properties on the Mechanism of H<sub>2</sub>S Removal by Alkaline-Activated Carbons

Rong Yan, Terence Chin, Yuen Ling Ng, Huiqi Duan, David Tee Liang, and Joo Hwa Tay

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## Collagen Fiber Immobilized *Myrica rubra* Tannin and Its Adsorption to UO<sub>2</sub><sup>2+</sup>

Xuepin Liao, Zhongbi Lu, Xiao Du, Xin Liu, and Bi Shi A novel adsorbent was prepared by immobilizing *Myrica rubra* tannin onto collagen fiber matrices, and its adsorption behavior to UO<sub>2</sub><sup>2+</sup> was extensively investigated.

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# Photocatalysis by Titanium Dioxide and Polyoxometalate/TiO<sub>2</sub> Cocatalysts. Intermediates and Mechanistic Study

Chuncheng Chen, Pengxiang Lei, Hongwei Ji, Wanhong Ma, Jincai Zhao, Hisao Hidaka, and Nick Serpone

Loading tungstophosphatic acid on the TiO<sub>2</sub> surface enhances charge separation and then the dechlorination of chlorophenols but greatly suppresses its mineralization.

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# Interactions of Soil-Derived Dissolved Organic Matter with Phenol in Peroxidase-Catalyzed Oxidative Coupling Reactions

Qingguo Huang and Walter J. Weber, Jr.

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#### Efficient Hydrogen Sulfide Adsorbents Obtained by Pyrolysis of Sewage Sludge-Derived Fertilizer Modified with Spent Mineral Oil

Andrey Bagreev and Teresa J. Bandosz

Pyrolysis of sewage sludge-derived fertilizer impregnated with mineral oil leads to efficient hydrogen sulfide adsorbents; on their surface, H<sub>2</sub>S is converted mainly to elemental sulfur.

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#### Microbial Mercury Transformation in Anoxic Freshwater Sediments under Iron-Reducing and Other Electron-Accepting Conditions

Kimberly A. Warner, Eric E. Roden, and Jean-Claude Bonzongo

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