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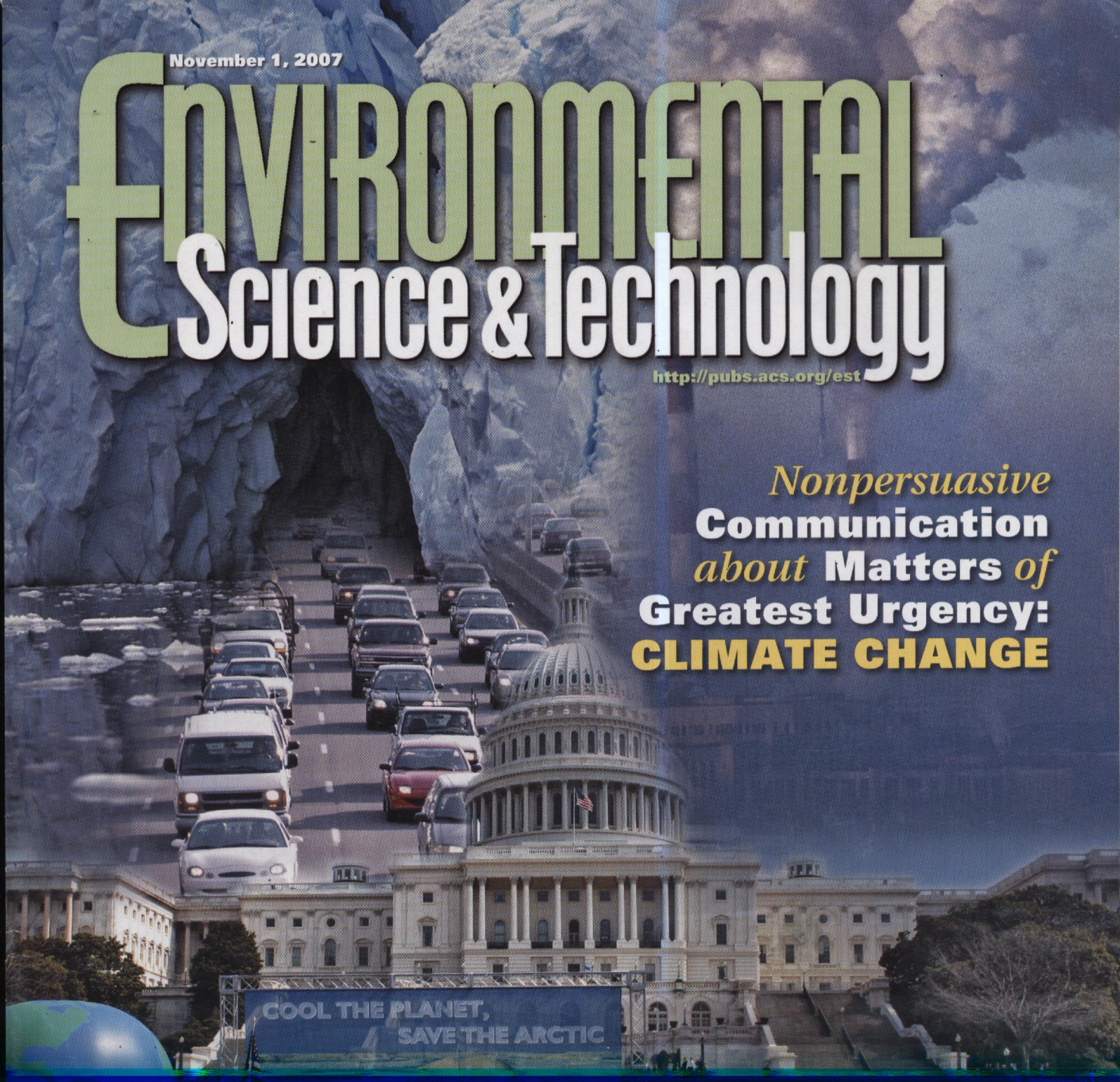

Nonpersuasive Communication *about* Matters *of* Greatest Urgency: CLIMATE CHANGE

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ENVIRONMENTAL Science & Technology

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News and Features

NEWS

VIEWPOINT

The prospect of global climate change has mobilized the scientific community. In general, scientists aim to be politically neutral—estimating the impacts that might mat-

Research

CHARACTERIZATION OF NATURAL AND AFFECTED ENVIRONMENTS

The temporal and spatial deposition of PBDEs, pesticides, PCBs, and PAHs to Rocky Mountain National Park with respect to source regions and topographic barriers is determined.

■ 7242

Use of Chemical Fingerprinting to Establish the Presence of Spilled Crude Oil in a Residential Area Following Hurricane Katrina, St. Bernard Parish, Louisiana

Scott A. Stout, Bo Liu, Glenn C. Millner, Dyron Hamlin, and Edward Healey

Hurricane Katrina's floodwaters dispersed and mixed spilled crude oil with other oils and natural organic matter throughout a residential area; tiered chemical fingerprinting of nearly 15,000 samples is used to define the areas impacted.

■ 7252

Snapping Turtles (*Chelydra serpentina*) as Bioindicators in Canadian Areas of Concern in the Great Lakes Basin. 1. Polybrominated Diphenyl Ethers, Polychlorinated Biphenyls, and Organochlorine Pesticides in Eggs

S. R. de Solla, K. J. Fernie, R. J. Letcher, S. G. Chu, K. G. Drouillard, and S. Shahmiri

PCB, PBDE, and OC pesticide concentrations in snapping turtle eggs reflect nearby urban and industrial sources in the lower Great Lakes.

■ 7260

Riverine Discharge of Perfluorinated Carboxylates from the European Continent

Michael S. McLachlan, Katrin E. Holmström, Margot Reth, and Urs Berger

European riverine discharges of PFHxA greatly exceed available emissions estimates, whereas PFOA discharges and emissions estimates are in reasonable agreement.

■ 7266

Deposition and Cycling of Sulfur Controls Mercury Accumulation in Isle Royale Fish

Paul E. Drevnick, Donald E. Canfield, Patrick R. Gorski, Avery L. C. Shinneman, Daniel R. Engstrom, Derek C. G. Muir, Gerald R. Smith, Paul J. Garrison, Lisa B. Cleckner, James P. Hurley, Robert B. Noble, Ryan R. Otter, and James T. Oris

The deposition and cycling of sulfur have controlled mercury accumulation in fish at Isle Royale for the past century, suggesting that controls on anthropogenic sulfur emissions are necessary to reduce mercury concentrations in freshwater fish.

■ 7273

Characteristics of Dissolved Organic Matter in Baltic Coastal Sea Ice: Allochthonous or Autochthonous Origins?

Colin A. Stedmon, David N. Thomas, Mats Granskog, Hermanni Kaartokallio, Stathys Papadimitriou, and Harri Kuosa

Organic carbon and nitrogen in Baltic Sea ice are bound in terrestrial humic material trapped during ice formation rather than produced by ice organisms.

Variable clustering and regression methods are applied to patterns of World Trade Center dioxin measurements for differentiating fire-based and background environmental sources.

■ 7294

Phenols and Hydroxy-PAHs (Arylphenols) as Tracers for Coal Smoke Particulate Matter: Source Tests and Ambient Aerosol Assessments

Bernd R. T. Simoneit, Xinhui Bi, Daniel R. Oros, Patricia M. Medeiros, Guoying Sheng, and Jiamo Fu

Hydroxy-PAHs, identified as specific tracers in coal smoke of source tests, are used to differentiate emissions from fossil fuel use in particulate matter of urban atmospheres.

ENVIRONMENTAL PROCESSES

7303

Solubility of Hematite Revisited: Effects of Hydration

Je-Hun Jang, Brian A. Dempsey, and William D. Burgos

The interfacial hydration of anhydrous hematite results in higher solubility than predicted by bulk thermodynamic properties of hematite.

7309

Ternary Nucleation as a Mechanism for the Production of Diesel Nanoparticles: Experimental Analysis of the Volatile and Hygroscopic Properties of Diesel Exhaust Using the Volatilization and Humidification Tandem Differential Mobility Analyzer

N. K. Meyer and Z. D. Ristovski

Simultaneous measurement of the volatile and hygroscopic properties of diesel exhaust particles at high load shows that ternary nucleation is involved in nucleation mode nucleation-mode particle formation.

■ 7315

How Does Infiltration Behavior Modify the Composition of Ambient $PM_{2.5}$ in Indoor Spaces? An Analysis of RIOPA Data

Qing Yu Meng, Barbara J. Turpin, Jong Hoon Lee, Andrea Polidori, Clifford P. Weisel, Maria Morandi, Steven Colome, Junfeng Zhang, Thomas Stock, and Arthur Winer

Outdoor-to-indoor transport of ambient $PM_{2.5}$ changes its composition, enhancing secondary sulfate and organics and depleting mechanically generated PM.

■ 7322

Simulation of the Chemical Fate and Bioavailability of Liquid Elemental Mercury Drops from Gold Mining in Amazonian Freshwater Systems

Yannick Dominique, Bogdan Muresan, Robert Duran, Sandrine Richard, and Alain Boudou

The chemical fate and bioavailability of liquid elemental mercury drops issued from gold mining are studied through a microcosm approach.

aniline in systems that contain Fe(II) and dissolved organic matter isolates from natural waters.

■ 7343

Speciation-Dependent Microbial Reduction of Uranium within Iron-Coated Sands

Jim Neiss, Brandy D. Stewart, Peter S. Nico, and Scott Fendorf

Microbial reduction of uranium(VI), and subsequent precipitation of UO_2, in iron(III) (hydr)oxide matrixes with finite residence times is regulated by the presence of dissolved calcium and formation of ternary calcium–uranyl–carbonato complexes.

■ 7349

Dissipation and Transport of Veterinary Sulfonamide Antibiotics after Manure Application to Grassland in a Small Catchment

Krispin Stoob, Heinz P. Singer, Stephan R. Mueller, René P. Schwarzenbach, and Christian H. Stamm

The fate of veterinary sulfonamide antibiotics in soil and their transport to surface waters are investigated after manure applications during variable weather conditions.

■ 7356

Mercury Emission to the Atmosphere from Experimental Manipulation of DOC and UVR in Mesoscale Field Chambers in a Freshwater Lake

Stephen C. Peters, Jennifer L. Wollenberg, Donald P. Morris, and Jason A. Porter

The volatilization of mercury from the water surface is used to experimentally test the effects of DOC and UVR on photoreactions that occur in the water column.

■ 7363

Bioconcentration Factor Hydrophobicity Cutoff: An Artificial Phenomenon Reconstructed

Michiel T. O. Jonker and Stephan A. van der Heijden

The bioconcentration factor cutoff often observed for hydrophobic chemicals with log $K_{ow} > 5.5–6$ is experimentally demonstrated to be an artificial phenomenon caused by third-phase effects and nonequilibrium conditions.

7370

Evidence for a Radical Mechanism of the Dechlorination of Chlorinated Propenes Mediated by the Tetrachloroethene Reductive Dehalogenase of *Sulfurospirillum multivorans*

Roland P. H. Schmitz, Julia Wolf, Andreas Habel, Anke Neumann, Kerstin Ploss, Ales Svatos, Wilhelm Boland, and Gabriele Diekert

Evidence is presented for a radical mechanism of the dechlorination of propenes mediated by the tetrachloroethene reductive dehalogenase of *S. multivorans*.

■ 7376

Evidence for Elevated Production of Methylmercury in Salt Marshes

7389

Atmospheric Chemistry of 2-ethoxy-3,3,4,4,5-pentafluorotetrahydro-2,5-bis[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-furan: Kinetics, Mechanisms, and Products of Cl Atom and OH Radical Initiated Oxidation

M. S. Javadi, O. J. Nielsen, T. J. Wallington, M. D. Hurley, and J. G. Owens

The subject hydrofluoroether is shown to have a negligible global warming potential, and no adverse impacts are expected from the degradation products.

■ 7396

Transport and Retention of Colloidal Aggregates of C_{60} in Porous Media: Effects of Organic Macromolecules, Ionic Composition, and Preparation Method

Benjamin Espinasse, Ernest M. Hotze, and Mark R. Wiesner

Organic macromolecules may either increase or decrease the retention of fullerene nanomaterials in a saturated porous medium, whereas higher salt concentrations favor retention.

■ 7403

Secondary Organic Aerosol Formation from the Photooxidation of *p*- and *o*-Xylene

Chen Song, Kwangsam Na, Bethany Warren, Quentin Malloy, and David R. Cocker, III

Investigation of the photochemical production of SOAs from xylene isomers with and without NO_x provides insight into the chemical pathways for formation.

■ 7409

Secondary Organic Aerosol Formation from *m*-Xylene in the Absence of NO_x

Chen Song, Kwangsam Na, Bethany Warren, Quentin Malloy, and David R. Cocker, III

A series of NO_x experiments with and without CO and with addition of NO after the reaction commences provides insight into aromatic SOA formation processes.

7417

Influence of Sources on Plutonium Mobility and Oxidation State Transformations in Vadose Zone Sediments

Daniel I. Kaplan, Brian A. Powell, Martine C. Duff, Deniz I. Demirkanli, Miles Denham, Robert A. Fjeld, and Fred J. Molz

Plutonium release and changes in oxidation state from solid Pu(III), Pu(IV), and Pu(V) sources buried in sediment are examined after 2 and 11 years.

7424

Unexpected Response of High Alpine Lake Waters to Climate Warming

Hansjörg Thies, Ulrike Nickus, Volkmar Mair, Richard Tessadri, Danilo Tait, Bertha Thaler, and Roland Psenner

Melting of rock glaciers induced by climate warming in the Alps has strongly increased the solute concentration in two high-altitude lakes over the past 20 years.

Alok D. Bokare, Rajeev C. Chikate, Chandrashekhar V. Rode, and Kishore M. Paknikar

Fe–Ni bimetallic nanoparticles degrade Orange G, a monoazo dye in aqueous solution reductively or oxidatively depending on the duration and type of nanocatalyst aging process.

ENVIRONMENTAL MODELING

■ 7444

Including Spatial Variability in Monte Carlo Simulations of Pesticide Leaching

Bertrand Leterme, Marnik Vanclooster, Ton van der Linden, Aaldrik Tiktak, and Mark D. A. Rounsevell

A methodology is developed to quantify the uncertainty in a regional-scale pesticide leaching assessment, arising from the spatial variability of nongeoreferenced parameters, and is applied to assess atrazine leaching in a Belgian catchment.

■ 7451

Cost Effectiveness of Regulation-Compliant Filtration to Control Sediment and Metal Pollution in Urban Runoff

C. Scott Smith, Raul P. Lejano, Oladele A. Ogunseitan, and J. Aaron Hipp

A cost-effectiveness model is studied that is useful for implementing a progressive strategy toward installing storm drain filters to remove pollutants from urban runoff.

ENVIRONMENTAL MEASUREMENTS METHODS

7459

Synthesis of Octabrominated Diphenyl Ethers from Aminodiphenyl Ethers

Daniel Teclechiel, Anna Christiansson, Åke Bergman, and Göran Marsh

A methodology is presented for synthesis of six novel octabrominated diphenyl ethers and characterization of the compounds.

■ 7464

Size Distribution of Trace Organic Species Emitted from Light-Duty Gasoline Vehicles

Sarah G. Riddle, Michael A. Robert, Chris A. Jakober, Michael P. Hannigan, and Michael J. Kleeman

PAH and hopane + sterane size distributions emitted from light-duty gasoline vehicles depend on both the driving cycle and the vehicle condition.

■ 7472

Predicting PAH Bioaccumulation and Toxicity in Earthworms Exposed to Manufactured Gas Plant Soils with Solid-Phase Microextraction

Michiel T. O. Jonker, Stephan A. van der Heijden, Joseph P. Kreitinger, and Steven B. Hawthorne

Solid-phase microextraction measurements successfully predict bioaccumulation and toxicity of PAHs in earthworms exposed to a series of MGP soils.

Aqueous solutions of hydrogen peroxide and methanol are studied as actinometry solutions for UV photoreactors active at <300 nm.

REMEDIATION AND CONTROL TECHNOLOGIES

■ 7491

Characteristics of $CuO–MoO_3–P_2O_5$ Catalyst and Its Catalytic Wet Oxidation (CWO) of Dye Wastewater under Extremely Mild Conditions

Hongzhu Ma, Qiongfang Zhuo, and Bo Wang

An economical process is described for decoloration of dye by CWO for the treatment of wastewater from textile and paper industries under extremely mild conditions.

■ 7497

Reaction of Water-Stable C_{60} Aggregates with Ozone

John D. Fortner, Doo-Il Kim, Adina M. Boyd, Joshua C. Falkner, Sean Moran, Vicki L. Colvin, Joseph B. Hughes, and Jae-Hong Kim

In the presence of dissolved ozone, oxidative transformation directly and readily occurs, resulting in highly oxidized, fullerene-based derivatives that are hydrophilic and water-soluble.

■ 7503

Electrocatalytic Hydrodechlorination of 2,4,5-Trichlorobiphenyl on a Palladium-Modified Nickel Foam Cathode

Bo Yang, Gang Yu, and Jun Huang

The mechanisms of electrocatalytic hydrodechlorination are proposed for 2,4,5-PCB on Pd-modified Ni foam, including the reaction pathways and electrocatalytic processes.

■ 7509

Municipal Solid Waste Fueled Power Generation in China: A Case Study of Waste-to-Energy in Changchun City

Hefa Cheng, Yanguo Zhang, Aihong Meng, and Qinghai Li

Waste-to-energy technology is a promising solution to the challenge of municipal solid-waste disposal and the demand for alternative energy sources in China.

7516

Reactive Adsorption of NO_2 at Dry Conditions on Sewage Sludge-Derived Materials

Robert Pietrzak and Teresa J. Bandosz

The mechanism of NO_2 retention on the surface of sewage-sludge-derived adsorbents is investigated.

■ 7523

Catalytic Reduction of Chlorobenzenes with Pd/Fe Nanoparticles: Reactive Sites, Catalyst Stability, Particle Aging, and Regeneration

Bao-Wei Zhu and Teik-Thye Lim

■ 7536

Characteristics of Solidified Products Containing Radioactive Molten Salt Waste

Hwan-Seo Park, In-Tae Kim, Yong-Zun Cho, Hee-Chul Eun, and Joon-Hyung Kim

The gel-route stabilization and solidification method may be considered as a prospective method for the solidification of radioactive molten salt wastes.

SUSTAINABILITY ENGINEERING AND GREEN CHEMISTRY

■ 7543

What Gets Recycled: An Information Theory Based Model for Product Recycling

Jeffrey B. Dahmus and Timothy G. Gutowski

A model of recycling is developed and compared with data on 20 products in the U.S.; historical data show a trend toward less recyclable products.

7551

Life Cycle Impact Assessment Weights to Support Environmentally Preferable Purchasing in the United States

Thomas P. Gloria, Barbara C. Lippiatt, and Jennifer Cooper

Contemporary weights are presented to support life-cycle-based environmentally preferable purchasing in the U.S.

7558

▶ **Energy and Material Balance of CO_2 Capture from Ambient Air**

Frank Zeman

A new interpretation of existing technologies for air capture is presented to establish a benchmark technology for assessment and comparison of proposed air-capture technologies.

■ 7564

Open Air Biocathode Enables Effective Electricity Generation with Microbial Fuel Cells

Peter Clauwaert, David van der Ha, Nico Boon, Kim Verbeken, Marc Verhaege, Korneel Rabaey, and Willy Verstraete

Microbial fuel cells with an open-air biological cathode can be used for a high current and power output without a chemical catalyst.

ECOTOXICOLOGY AND HUMAN ENVIRONMENTAL HEALTH

■ 7570

Toxicogenomic Response to Chlorination Includes Induction of Major Virulence Genes in *Staphylococcus aureus*

Matthew Wook Chang, Freshteh Toghrol, and William E. Bentley

Genomewide gene expression analysis of the response of *S. aureus* to chlorination is described.

7576

Metabolite Profiles of Di-*n*-butyl Phthalate in Humans and Rats

Manori J. Silva, Ella Samandar, John A. Reidy, Russ Hauser, Larry L. Needham, and Antonia M. Calafat

The presence of mono-*n*-butyl phthalate is confirmed, and three di-*n*-butyl phthalate (DBP) oxidative metabolic products are identified in human urine and in urine and serum of rats administered DBP.

7581

Uptake, Elimination, and Relative Distribution of Perchlorate in Various Tissues of Channel Catfish

June-Woo Park, Carrie M. Bradford, Jacques Rinchard, Fujun Liu, Mike Wages, Aaron Waters, Ronald J. Kendall, Todd A. Anderson, and Christopher W. Theodorakis

Sodium perchlorate is rapidly taken up and eliminated from channel catfish and is not bioconcentrated; the greatest concentrations are in the head and fillet.

■ **Supporting information is available free at http://pubs.acs.org/est.**
▶ **This issue contains a news story about this research.**