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ENVIRONMENTAL Science & Technology

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Sea Surface Chemical **CONTAMINATION** after Shipping Accidents



ES&T's Best Papers of 2007

Testing the Accuracy of Retail
Biodiesel Blends

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THE AMERICAN
CHEMICAL SOCIETY

CRITICAL REVIEW

■ 2221

Exergy: Its Potential and Limitations in Environmental Science and Technology

Jo Dewulf,* Herman Van Langenhove, Bart Muys, Stijn Bruers, Bhavik R. Bakshi, Geoffrey F. Grubb, D. M. Paulus, and Enrico Sciubba

This review explains the exergy concept and its contribution in ecosystem analysis, industrial system analysis, thermoeconomic analysis, and environmental impact assessment.

2233

Enzymatic Approach in Microbial-Influenced Corrosion: A Review Based on Stainless Steels in Natural Waters

J. Landoulsi,* K. El Kirat, C. Richard, D. Féron, and S. Pulvin

Enzymatic systems may constitute convenient models to mimic microbial influenced corrosion and to evaluate the behavior of metallic materials in natural waters.

■ 2243

Electron Impact and Electron Capture Negative Ionization Mass Spectra of Polybrominated Diphenyl Ethers and Methoxylated Polybrominated Diphenyl Ethers

Ronald A. Hites

EI and ECNI spectra of 18 PBDEs and 12 methoxy-BDEs are presented in full, and the structural features of these spectra are discussed in detail.

POLICY ANALYSIS

2253

Use of Nanoparticles in Swiss Industry: A Targeted Survey

Kaspar Schmid and Michael Riediker*

This targeted phone survey shows the patterns of nanoparticle usage in Swiss industry and the applied protection means.

■ 2261

Scenario Projections for Future Market Potentials of Biobased Bulk Chemicals

Veronika Dornburg,* Barbara G. Hermann, and Martin K. Patel

Future market potentials of biobased bulk chemicals are estimated for the EU-25, and resulting energy savings, greenhouse gas emission reductions, and land requirements are calculated.

■ 2268

Expert Judgment Assessment of the Mortality Impact of Changes in Ambient Fine Particulate Matter in the U.S.

Henry A. Roman,* Katherine D. Walker, Tyra L. Walsh, Lisa Conner, Harvey M. Richmond, Bryan J. Hubbell, and Patrick L. Kinney

State of the art expert judgment elicitation methods are applied in this comprehensive characterization of uncertainty related to the mortality impacts of ambient fine particles.

CHARACTERIZATION OF NATURAL AND AFFECTED ENVIRONMENTS

■ 2275

Characterization of Sea Surface Chemical Contamination after Shipping Accidents

Carlos Guitart,* Patricia Frickers, Jose Horrillo-Caraballo, Robin J. Law, and James W. Readman

Distributions, chemical fingerprinting, and processes of the spilled oils at the sea surface after an incident of a cargo ship are studied.

■ 2283

Flushing History as a Hydrogeological Control on the Regional Distribution of Arsenic in Shallow Groundwater of the Bengal Basin

A. van Geen,* Y. Zheng, S. Goodbred, Jr., A. Horneman, Z. Aziz, Z. Cheng, M. Stute, B. Mailloux, B. Weinman, M. A. Hoque, A. A. Seddique, M. S. Hossain, S. H. Chowdhury, and K. M. Ahmed

Evidence of adsorptive equilibration of As between groundwater and aquifer particles constrains the time scale over which Bangladesh aquifers no longer present a health risk.

■ 2289

Effect of Ethanol on Microbial Community Structure and Function During Natural Attenuation of Benzene, Toluene, and o-Xylene in a Sulfate-reducing Aquifer

Kevin Feris,* Doug Mackay, Nick de Sieyes, Irina Chakraborty, Murray Einarson, Krassimira Hristova, and Kate Scow

In a continuous release field experiment, ethanol altered microbial community structure/function, lowered the redox state, and slowed biodegradation of coreleased BTo-X in an anaerobic aquifer.

■ 2295

Contamination and Effects of Perfluorochemicals in Baikal Seal (*Pusa sibirica*). 1. Residue Level, Tissue Distribution, and Temporal Trend

Hiroshi Ishibashi, Hisato Iwata,* Eun-Young Kim, Lin Tao, Kurunthachalam Kannan, Masao Amano, Nobuyuki Miyazaki, Shinsuke Tanabe, Valeriy B. Batoev, and Evgeny A. Petrov

The concentration, tissue distribution, and temporal trend of perfluorochemicals including perfluoroalkylsulfonates and perfluoroalkylcarboxylates in the liver and serum of Baikal seals (*Pusa sibirica*) are revealed.

■ 2302

Contamination and Effects of Perfluorochemicals in Baikal Seal (*Pusa sibirica*). 2. Molecular Characterization, Expression Level, and Transcriptional Activation of Peroxisome Proliferator-Activated Receptor α

Hiroshi Ishibashi, Hisato Iwata,* Eun-Young Kim, Lin Tao, Kurunthachalam Kannan, Shinsuke Tanabe, Valeriy B. Batoev, and Evgeny A. Petrov

The molecular characteristics and expression levels of the peroxisome proliferator-activated receptor α from Baikal seals (*Pusa sibirica*) and the potentials of transcriptional activation by perfluorochemicals are clarified.

■ 2309

Assessment of Heavy Metals Remobilization by Fractionation: Comparison of Leaching Tests Applied to Roadside Sediments

Gustavo Pérez, Montserrat López-Mesas, and Manuel Valiente*

Heavy metals pollution deposited over roadside sediments is assessed by means of several leaching tests determining environmental concentration guideline values and concentration enrichment ratios.

■ 2316

Influence of Trophic Position and Spatial Location on Polychlorinated Biphenyl (PCB) Bioaccumulation in a Stream Food Web

David M. Walters,* Ken M. Fritz, Brent R. Johnson, James M. Lazorchak, and Frank H. McCormick

$\delta^{15}\text{N}$ -derived trophic position strongly predicts contaminant biomagnification in streams, but biomagnification is low relative to that in marine and lentic systems.

■ 2323

Gulf of Mexico Hypoxia: Alternate States and a Legacy

R. Eugene Turner,* Nancy N. Rabalais, and Dubravko Justic

A larger dead zone is created each year for the same nutrient loading because of increased sediment oxygen demand and lack of progress from the Hypoxia Action Plan.

2328

Historical Distribution and Partitioning of Phosphorus in Sediments in an Agricultural Watershed in the Yangtze-Huaihe Region, China

Hong Zhang and Baoqing Shan*

Using ^{137}Cs proxy, the P retention history is reconstructed to evaluate effects of agricultural intensification on water quality in the watershed during the past few decades.

■ 2334

Atmospherically Deposited PBDEs, Pesticides, PCBs, and PAHs in Western U.S. National Park Fish: Concentrations and Consumption Guidelines

Luke K. Ackerman, Adam R. Schwindt, Staci L. Massey Simonich,* Dan C. Koch, Tamara F. Blett, Carl B. Schreck, Michael L. Kent, and Dixon H. Landers

PBDE, pesticide, PCB, and PAH concentrations are measured in Western U.S. national park fish and compared to human and wildlife health consumption guidelines.

ENVIRONMENTAL PROCESSES

■ 2342

Directed Synthesis of Hierarchical Nanostructured TiO_2 Catalysts and their Morphology-Dependent Photocatalysis for Phenol Degradation

Lu Liu,* Huajie Liu, Ya-Ping Zhao,* Yuqiu Wang, Yueqin Duan, Guandao Gao, Ming Ge, and Wei Chen*

TiO_2 3D_{0D} microspheres (anatase nanoparticle-assembled), 1D nanorods (rutile), and 3D_{1D} microspheres (nanorods-assembled) exhibit the same degradation pathway for phenol degradation.

■ 2349

Mechanisms of Photocatalytical Degradation of Monomethylarsonic and Dimethylarsinic Acids Using Nanocrystalline Titanium Dioxide

Zhonghou Xu, Chuanyong Jing, Fasheng Li, and Xiaoguang Meng*

MMA and DMA are photocatalytically degraded to inorganic arsenate and organic carbon including formic acid in a nanocrystalline TiO_2 -UV system.

2355

Reductive Dissolution of Pu(IV) by *Clostridium* sp. Under Anaerobic Conditions

Arokiasamy J. Francis,* Cleveland J. Dodge, and Jeffrey B. Gillow

Remobilization of Pu in subsurface environments can be brought about by the activities of anaerobic microorganisms by reductive dissolution of insoluble tetravalent Pu to its trivalent form and thus affect its long-term stability and mobility.

■ 2361

Extended X-ray Absorption Fine Structure Analysis of Arsenite and Arsenate Adsorption on Maghemite

Guillaume Morin,* Georges Ona-Nguema, Yuheng Wang, Nicolas Menguy, Farid Juillot, Olivier Proux, François Guyot, Georges Calas, and Gordon E. Brown, Jr.

EXAFS analysis indicates that arsenite and arsenate form inner-sphere complexes on the surface of maghemite with distinctly different sorption complexes for As(III) and As(V).

■ 2367

EXAFS Study on the Reactions between Iron and Fulvic Acid in Acid Aqueous Solutions

Joris W. J. van Schaik,* Ingmar Persson, Dan Berggren Kleja, and Jon Petter Gustafsson

Iron(III) forms fulvic acid complexes at pHs 2 and 4; mononuclear solution complexes and polynuclear iron(III) solid-phase complexes, even at low pH, may be phase-dependent.

■ 2374

Altitudinal Transect of Atmospheric and Aqueous Fluorinated Organic Compounds in Western Canada

Mark Loewen,* Frank Wania, Feiyue Wang, and Gregg Tomy

Passive air sampler concentrations of neutral PFASs increase over an altitudinal transect in Western Canadian mountains during the snowmelt and summer seasons while lake water concentrations of PFOS and PFCAs do not show such a relationship.

■ 2380

Redox Reactions of Phenazine Antibiotics with Ferric (Hydr)oxides and Molecular Oxygen

Yun Wang and Dianne K. Newman*

The structure–reactivity relationships for redox reactions of phenazine natural products with Fe(III) minerals and molecular oxygen are explored.

■ 2387

Measurement and Implications of Nonphotochemically Generated Superoxide in the Equatorial Pacific Ocean

Andrew L. Rose,* Eric A. Webb, T. David Waite, and James W. Moffett

Superoxide is maintained at picomolar concentrations in the Costa Rica Dome upwelling region of the equatorial Pacific Ocean by a particle-associated, nonphotochemical source.

2394

Night-Time Atmospheric Fate of Acrolein and Crotonaldehyde

M. S. Salgado,* E. Monedero, F. Villanueva, P. Martín, A. Tapia, and B. Cabañas

Absolute rate coefficients for the gas-phase reaction of the NO_3 radical with acrolein and crotonaldehyde are measured using a discharge flow system and monitoring NO_3 radical by laser induced fluorescence.

■ 2401

Thermodynamic Evaluation on H_2 Production in Glucose Fermentation

Hyung-Sool Lee,* Michael B. Salerno, and Bruce E. Rittmann

The work assesses how thermodynamics can control biohydrogen production in mesophilic glucose fermentation using mixed culture.

2408**Catechol Siderophores Control Tungsten Uptake and Toxicity in the Nitrogen-Fixing Bacterium *Azotobacter vinelandii***

Thomas Wichard, Jean-Philippe Bellenger, Aurélie Loison, and Anne M. L. Kraepiel*

The catechol siderophores released by the soil diazotroph *Azotobacter vinelandii* are used to modulate the uptake of essential (Fe, Mo) and toxic (W) metals.

2414**Facilitating Effects of Metal Cations on Phenanthrene Sorption in Soils**

Lei Luo, Shuzhen Zhang,* Yibing Ma, Peter Christie, and Honglin Huang

Polyvalent metal cations can facilitate phenanthrene sorption by soils via effects on the physical configuration and chemical characteristics of soil organic carbon.

2420**Anaerobic Corrosion Reaction Kinetics of Nanosized Iron**

Eric J. Reardon,* Randal Fagan, John L. Vogan, and Andrzej Przepiora

Short-term corrosion tests of nanosized Fe⁰ may underestimate both its longevity for dehalogenation and as a long-term hydrogen source in subsurface remediation applications.

2426**Evaluating Bacteriophage P22 as a Tracer in a Complex Surface Water System: The Grand River, Michigan**

Chaopeng Shen, Mantha S. Phanikumar,* Theng T. Fong, Irfan Aslam, Shawn P. McElmurry, Stephanie L. Molloy, and Joan B. Rose*

Bacteriophage P22 is successfully used as a tracer in a complex surface water system, and the role of watershed-scale processes on the transport is investigated.

2432**Photochemical Degradation of Polycyclic Aromatic Hydrocarbons in Oil Films**

Desirée L. Plata,* Charles M. Sharpless, and Christopher M. Reddy

Direct photochemical weathering of select polycyclic hydrocarbons (PAHs) on oil-spill-impacted rocks does not account for the observed PAH removal rates.

2439**Evidence for Incorporation of H₂S in Groundwater Fulvic Acids from Stable Isotope Ratios and Sulfur K-edge X-ray Absorption Near Edge Structure Spectroscopy**

Florian Einsiedl,* Bernhard Mayer, and Thorsten Schäfer

The sulfur cycle in groundwater systems is affected by fulvic acids.

2445**Whole Cell Electrochemistry of Electricity-Producing Microorganisms Evidence an Adaptation for Optimal Exocellular Electron Transport**

Juan Pablo Busalmen,* Abraham Esteve-Nuñez, and Juan Miguel Feliu

Electrogenic bacteria are able to change the way through which they exchange electrons with an electrode as a response to changes in the applied potential.

2451**Immobilization of Selenite on Fe₃O₄ and Fe/Fe₃C Ultrasmall Particles**

Raquel López de Arroyabe Loyo, Sergei I. Nikitenko,* Andreas C. Scheinost, and Monique Simonoff

The extremely rapid sorption of selenite ions to Fe₃O₄ and Fe/Fe₃C nanoparticles causes Se(IV) reduction to Se(-II) for Fe/Fe₃C and not for Fe₃O₄.

ENVIRONMENTAL MODELING**2457****Beyond the Rayleigh Equation: Reactive Transport Modeling of Isotope Fractionation Effects to Improve Quantification of Biodegradation**

Boris M. Van Breukelen* and Henning Prommer

A numerical modeling approach is used to explore stable isotope fractionation effects in contaminant plumes that are not captured by the Rayleigh equation.

2464**Adsorption of Glyphosate on Goethite (α-FeOOH): Surface Complexation Modeling Combining Spectroscopic and Adsorption Data**

Caroline M. Jonsson, Per Persson, Staffan Sjöberg, and John S. Loring*

A surface complexation model is reported for the goethite-PMG system that is based on a 1 pK Basic Stern model and is consistent with previous spectroscopic results.

2470**Kinetics of Dyes Adsorption at the Solid-Solution Interfaces: A Theoretical Description Based on the Two-Step Kinetic Model**

Władysław Rudzinski* and Wojciech Plazinski

Kinetics of dyes sorption from solutions is a two-step process, governed first by the rate of surface reaction and, next, by the intraparticle diffusion.

ENVIRONMENTAL MEASUREMENTS METHODS**2476****Determination of Biodiesel Blending Percentages Using Natural Abundance Radiocarbon Analysis: Testing the Accuracy of Retail Biodiesel Blends**

Christopher M. Reddy,* Jared A. DeMello, Catherine A. Carmichael, Emily E. Peacock, Li Xu, and J. Samuel Arey

On the basis of a new radiocarbon-based method for measuring the accuracy of biodiesel blending, numerous blends collected in 2006 in the United States are found to have been improperly prepared.

2483**Fuel Use and Emissions Comparisons for Alternative Routes, Time of Day, Road Grade, and Vehicles Based on In-Use Measurements**

H. Christopher Frey,* Kaishan Zhang, and Nagui M. Roupail

Localized real-world vehicle emissions are sensitive to speed, acceleration, and road grade, and average emission rates are sensitive to route choice, traffic management, and driver behavior.

2490**Elemental, Isotopic, and Spectroscopic Assessment of Chemical Fractionation of Dissolved Organic Matter Sampled with a Portable Reverse Osmosis System**

Alexandre Ouellet, Dragosh Catana, Jean-Baptiste Plouhinec, Marc Lucotte, and Yves Gélinas*

Natural dissolved organic matter is only slightly chemically fractionated upon sampling when using a portable reverse osmosis system.

■ 2496

Physical and Chemical Characterization of Residential Oil Boiler Emissions

Michael D. Hays,* Lee Beck, Pamela Barfield, Richard J. Lavrich, Yuanji Dong, and Randy L. Vander Wal

Nuclei mode particle emissions from a modern residential oil boiler comprise organosulfur compounds and a unique carbon nanostructure that may influence Northeastern U.S. air quality.

■ 2503

Particle and Gas Emissions from a Simulated Coal-Burning Household Fire Pit

Linwei Tian, Donald Lucas,* Susan L. Fischer, S. C. Lee, S. Katharine Hammond, and Catherine P. Koshland

Chinese anthracite and bituminous coals produce different amounts of emissions when burned in a fire pit that simulates common rural household use of these fuels.

■ 2509

Influence of Calcium Content of Biomass-Based Materials on Simultaneous NO_x and SO₂ Reduction

Sarma V. Pisupati* and Sumeet Bhalla

The science and technology of reduction in CO₂, SO₂, and NO_x emissions through the use of biomass is studied.

■ 2515

Transport of Methane and Noble Gases during Gas Push–Pull Tests in Variably Saturated Porous Media

Katherine Gómez,* Graciela Gonzalez-Gil, Martin H. Schroth, and Josef Zeyer

The influence of water saturation on the transport of CH₄ and tracer noble gases during gas push–pull tests in porous media is evaluated.

■ 2522

Method for Quantifying Nitromethane in Blood as a Potential Biomarker of Halonitromethane Exposure

K. Udeni Alvis,* Benjamin C. Blount, Lalith K. Silva, Mitchell M. Smith, and Karl-Hermann Loose

Nitromethane is detected in all human blood samples tested using SPME–GC–HRMS and is a potential biomarker of exposure to nitromethane and halonitromethanes.

■ 2528

Altitudinal and Seasonal Variations of Persistent Organic Pollutants in the Bolivian Andes Mountains

Victor H. Estellano,* Karla Pozo, Tom Harner, Margot Franken, and Mauricio Zaballa

Using polyurethane foam disk passive air samplers, we assess the altitudinal and seasonal variation of persistent organic pollutants in the Bolivian Andes Mountains.

REMEDIATION AND CONTROL TECHNOLOGIES

2535

Hydraulic and Pollutant Removal Performance of Fine Media Stormwater Filtration Systems

Belinda E. Hatt,* Tim D. Fletcher, and Ana Deletic

Effective retention of particulates and associated pollutants by fine media stormwater filters is also a cause of reduced hydraulic capacity due to surface clogging.

■ 2542

N-15 NMR Study of the Immobilization of 2,4- and 2,6-Dinitrotoluene in Aerobic Compost

Kevin A. Thorn,* Judith C. Pennington, Kay R. Kennedy, Larry G. Cox, Charolett A. Hayes, and Beth E. Porter

2,4-Dinitrotoluene and 2,6-dinitrotoluene undergo reductive transformation to monoamines that subsequently form covalent bonds with organic matter during aerobic composting.

■ 2551

Characterization of Copper Adsorption onto an Alginate Encapsulated Magnetic Sorbent by a Combined FT-IR, XPS, and Mathematical Modeling Study

Soh-Fong Lim, Yu-Ming Zheng, Shuai-Wen Zou, and J. Paul Chen*

Copper adsorption onto an alginate encapsulated magnetic sorbent can be better described by a combined model with ion exchange, metal–organic coordination, and surface complex formation.

2557

Influence of Surface Charge Distributions and Particle Size Distributions on Particle Attachment in Granular Media Filtration

Jinkeun Kim, Jeffrey A. Nason, and Desmond F. Lawler*

Attachment and detachment of particles to and from media and previously captured particles are highly dynamic processes involving zeta potential distributions and size distributions.

■ 2563

Absorption, Tissue Distribution, And Elimination of Residues after 2,4,6-Trinitro[¹⁴C]toluene Administration to Sheep

D. J. Smith,* A. M. Craig, J. M. Durringer, and R. L. Chaney

Trinitrotoluene is rapidly transformed in sheep to metabolites that covalently bind to digesta and which are mainly excreted in feces as bound residues.

■ 2570

Capture of Dioxins by Ionic Liquids

Prashant S. Kulkarni,* Luís C. Branco, João G. Crespo, and Carlos A. M. Afonso*

Absorption and desorption of dioxin gases using thermally stable room temperature ionic liquids are demonstrated for the successful remediation of dioxins from several contaminated sources.

■ 2575

Volatilization and Biodegradation of Naphthalene in the Vadose Zone Impacted by Phytoremediation

Rikke G. Andersen, Elizabeth C. Booth, Linsey C. Marr, Mark A. Widdowson, and John T. Novak*

A major mechanism of naphthalene removal associated with phytoremediation is volatilization coupled with biodegradation enhanced by a phyto-induced lowering of the water table.

■ 2582

Stoichiometry of Coagulation Revisited

J. Y. Shin, R. F. Spinette, and C. R. O'Melia*

Relationships between optimum alum dosages and contaminant concentrations in raw water are developed and interpreted, with design and operation implications for potable water treatment facilities.

2590

Utilization of Ventilation Air Methane as a Supplementary Fuel at a Circulating Fluidized Bed Combustion Boiler

Changfu You* and Xuchang Xu

Ventilation air methane (VAM) utilization as supplementary fuel is evaluated; the experimentation shows that the VAM can be burnt completely in furnaces.

2594

Confounding Effects of Aqueous-Phase Impinger Chemistry on Apparent Oxidation of Mercury in Flue Gases

Brydger Cauch,* Geoffrey D. Silcox, JoAnn S. Lighty, Jost O. L. Wendt, Andrew Fry, and Constance L. Senior

The presence of Cl₂ in flue gas without SO₂ is found to oxidize Hg⁰ in aqueous conditioning system impingers, impacting laboratory scale experimental data on gas-phase mercury oxidation.

2600

Carbothermal Synthesis of Carbon-supported Nanoscale Zero-valent Iron Particles for the Remediation of Hexavalent Chromium

Laura B. Hoch, Elizabeth J. Mack, Bianca W. Hydutsky, Jessica M. Hershman, Joanna M. Skluzacek, and Thomas E. Mallouk*

The reaction at 600–800 °C of iron salts with carbon black yields carbon-supported nanoscale iron, which transports well in saturated sand and reacts rapidly with aqueous Cr(VI).

2606

Effect of Strongly Competing Background Compounds on the Kinetics of Trace Organic Contaminant Desorption from Activated Carbon

Priscilla C. To, Benito J. Mariñas,* Vernon L. Snoeyink, and Wun Jern Ng

The effect of direct surface competition by background organic matter on increasing the desorption kinetics of a trace contaminant is explored.

2612

TiO₂/Ti Rotating Disk Photoelectrocatalytic (PEC) Reactor: A Combination of Highly Effective Thin-Film PEC and Conventional PEC Processes on a Single Electrode

Yunlan Xu, Yi He, Xinde Cao, Dengjie Zhong, and Jinping Jia*

A highly efficient TiO₂/Ti rotating disk photoelectrocatalytic reactor applicable to treat high concentration industrial dye effluents is developed.

SUSTAINABILITY ENGINEERING AND GREEN CHEMISTRY

2618

Biobased Surfactant-Like Molecules from Organic Wastes: The Effect of Waste Composition and Composting Process on Surfactant Properties and on the Ability to Solubilize Tetrachloroethene (PCE)

Giorgia Quadri, Xiaosong Chen, James W. Jawitz, Fulvia Tambone, Pierluigi Genevini, Franco Faoro, and Fabrizio Adani*

Organic wastes are evaluated as a source of natural surfactants to enhance tetrachloroethene (PCE) water solubility.

2624

Sustainability of Uranium Mining and Milling: Toward Quantifying Resources and Eco-Efficiency

Gavin M. Mudd* and Mark Diesendorf

Data on uranium resources and energy, water, and greenhouse sustainability of uranium production are compiled, showing their sensitivity to deposit ore grade.

2631

Volatile Organic Compounds Absorption in a Cross-Flow Rotating Packed Bed

Yu-Shao Chen, Yi-Chun Hsu, Chia-Chang Lin, Clifford Yi-Der Tai, and Hwai-Shen Liu*

Absorption performance of VOCs in a cross-flow rotating packed bed is evaluated, and a correlation of $K_G a$ is proposed for the first time.

2637

The Effect of pH on Thiosulfate Formation in a Biotechnological Process for the Removal of Hydrogen Sulfide from Gas Streams

Pim L. F. van den Bosch,* Dmitry Y. Sorokin, Cees J. N. Buisman, and Albert J. H. Janssen

A new biotechnological process is described to remove hydrogen sulfide from sour gases as produced in the petrochemical industry.

ECOTOXICOLOGY AND HUMAN ENVIRONMENTAL HEALTH

2643

Coupling Hydrologic and Infectious Disease Models To Explain Regional Differences in Schistosomiasis Transmission in Southwestern China

Justin Remais,* Song Liang, and Robert C. Spear

The impact of hydrology on disease transmission is explored by coupling a lumped parameter rainfall-runoff model with a delay-differential equation schistosomiasis transmission model.

2650

Hexabromocyclododecane in White-Sided Dolphins: Temporal Trend and Stereoisomer Distribution in Tissues

Aaron M. Peck,* Rebecca S. Pugh, Amanda Moors, Michael B. Ellisor, Barbara J. Porter, Paul R. Becker, and John R. Kucklick

Trends in hexabromocyclododecane diastereomer concentrations and enantiomeric distributions in white-sided dolphins stranded on the eastern coast of the United States between 1993 and 2004 are reported.

2656

Effects of Diesel on Survival, Growth, and Gene Expression in Rainbow Trout (*Oncorhynchus mykiss*) Fry

Lizzy Mos,* Glenn A. Cooper, Kerrie Serben, Marc Cameron, and Ben F. Koop

Microarrays supply information on the mechanism of short-term effects (oxygen deprivation) and potential long-term impacts (feminization, immune system alterations) of diesel exposure on salmonids.

2663

Polycyclic Aromatic Hydrocarbons in Human Milk of Nonsmoking U.S. Women

Sung R. Kim,* Rolf U. Halden, and Timothy J. Buckley

Measurements suggest that average exposure of breastfed U.S. infants is comparable to that reported for European and Asian women, suggesting that health benefits from nursing outweigh risks from PAHs in milk.

■ 2668

Oxidative Stress during Baltic Salmon Feeding Migration May Be Associated with Yolk-sac Fry Mortality

Kristiina A. Vuori,* Mirella Kanerva, Erkki Ikonen, and Mikko Nikinmaa

Oxidative stress parameters of feeding Baltic salmon populations differ both regionally and temporally, and the temporal differences agree with the incidence of M74.

■ 2674

Heavy Metals Concentrations of Surface Dust from e-Waste Recycling and Its Human Health Implications in Southeast China

Anna O. W. Leung, Nurdan S. Duzgoren-Aydin, K. C. Cheung, and Ming H. Wong*

Uncontrolled recycling of printed circuit boards in China presents a significant environmental and human health risk.

■ 2681

Multivariate Data Analyses of Persistent Organic Pollutants in Maternal Adipose Tissue in Singapore

Jing Tan,* Qing Qing Li, Annamalai Loganath, Yap Seng Chong, Man Xiao, and Jeffrey Philip Obbard

Factors affecting accumulation of POPs in maternal adipose tissue in Singapore are investigated with the assistance of multivariate data analyses.

■ 2688

Carbon Nanotube-Based Electrochemical Sensor for Assay of Salivary Cholinesterase Enzyme Activity: An Exposure Biomarker of Organophosphate Pesticides and Nerve Agents

Jun Wang, Charles Timchalk, and Yuehe Lin*

A carbon nanotube-based electrochemical sensor for rapid and sensitive detection of salivary cholinesterase enzyme activities as exposure biomarkers is reported.

■ 2694

Comparative Absorption and Bioaccumulation of Polybrominated Diphenyl Ethers following Ingestion via Dust and Oil in Male Rats

Janice K. Huwe,* Heldur Hakk, David J. Smith, Janet J. Diliberto, Vicki Richardson, Heather M. Stapleton, and Linda S. Birnbaum

Polybrominated diphenyl ethers found in household dust have similar oral bioavailabilities in rats as compared to polybrominated diphenyl ethers dissolved in corn oil.

■ 2701

Increasing Perfluoroalkyl Contaminants in East Greenland Polar Bears (*Ursus maritimus*): A New Toxic Threat to the Arctic Bears

R. Dietz,* R. Bossi, F. F. Rigét, C. Sonne, and E. W. Born

PFC data from East Greenland polar bears from 1984 to 2006 show increasing trends with significantly yearly increases from 2.3 to 27.4% dependent on statistical method applied.

CORRESPONDENCE AND REBUTTAL

2708

Comment on "Emissions from Brake Linings and Tires: Case Studies of Stockholm, Sweden 1995/1998 and 2005"

Francesco Cetta,* Armand Dharmo, Gianfranco Schiraldi and Luigi Allegra

2710

Response to Comment on "Metal Emissions from Brake Linings and Tires: Case Studies of Stockholm, Sweden 1995/1998 and 2005"

D. S. T. Hjortenkrans,* B. G. Bergbäck, and A. V. Häggerud

■ Supporting information is available free at <http://pubs.acs.org/est>.
▶ This research is highlighted in the News and Features section.