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**Beyond
Technology
in Low Income
Countries: Integrating
Water, Sanitation,
and Hygiene**

ON THE COVER: Inadequate sanitation, one of many causes of environmental degradation in informal settlements, leads to increased incidence of diarrhea, an important contributor to childhood deaths in low-income countries. This issue's Feature article promotes an integrated perspective that incorporates improved planning, financial incentives, innovative technologies, and the psychology of behavior change to achieve universal access to water and sanitation.

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How To Give a Scientific Talk, Present a Poster, and Write a Research Paper or Proposal

Ronald A. Hites*

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Looking beyond Technology: An Integrated Approach to Water, Sanitation and Hygiene in Low Income Countries

Elizabeth Tilley, Linda Strande, Christoph Lüthi, Hans-Joachim Mosler, Kai M. Udert, Heiko Gebauer, and Janet G. Hering*

Despite investment stimulated by the Millennium Development Goals (MDGs), sanitation-related diseases, such as diarrhea, cholera and typhus, remain a leading cause of death of children under five in low-income countries. Prevention of diarrhea requires a combination of access to safe drinking water, good hygiene and adequate sanitation. The sanitation problem has proven to be particularly intractable, demonstrating the shortcomings of past efforts that have focused on increasing access to toilets. An alternative view positions the toilet within a service chain that extends to the final point of disposal or end-use of excreta-derived products. An integrated perspective that addresses improved planning, takes advantage of economic opportunities, incorporates specialized technology, and follows-up with behavior change could help to ensure not only access but also sustainable use, operation and maintenance of water, sanitation and hygiene interventions.

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Solution Speciation of Plutonium and Americium at an Australian Legacy Radioactive Waste Disposal Site


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20th Century Atmospheric Deposition and Acidification Trends in Lakes of the Sierra Nevada, California, USA

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Geochemical Control on Uranium(IV) Mobility in a Mining-Impacted Wetland


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[dx.doi.org/10.1021/es5020554](https://doi.org/10.1021/es5020554)

Mercury Isotope Study of Sources and Exposure Pathways of Methylmercury in Estuarine Food Webs in the Northeastern U.S.

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Diurnal Floc Generation from Neuston Biofilms in Two Contrasting Freshwater Lakes

Christopher N. Drudge and Lesley A. Warren*

Environmental Processes


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Uranium Bioreduction Rates across Scales: Biogeochemical Hot Moments and Hot Spots during a Biostimulation

Experiment at Rifle, Colorado

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[dx.doi.org/10.1021/es500517s](https://doi.org/10.1021/es500517s)

Variation in Terrestrial and Aquatic Sources of Methylmercury in Stream Predators as Revealed by Stable Mercury Isotopes

Martin Tsz-Ki Tsui,* Joel D. Blum, Jacques C. Finlay, Steven J. Balogh, Yabing H. Nollet, Wendy J. Palen, and Mary E. Power

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[dx.doi.org/10.1021/es500833z](https://doi.org/10.1021/es500833z)

Enhanced Transport of Phenanthrene and 1-Naphthol by Colloidal Graphene Oxide Nanoparticles in Saturated Soil

Zhichong Qi, Lei Hou, Dongqiang Zhu, Rong Ji, and Wei Chen*

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Removal of the Iodinated X-ray Contrast Medium Diatrizoate by Anaerobic Transformation


Maria Redeker, Ame Wick, Björn Meermann, and Thomas A. Ternes*

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Heterogeneous Reactions of Particulate Matter-Bound PAHs and NPAHs with NO₃/N₂O₅, OH Radicals, and O₃ under Simulated Long-Range Atmospheric Transport Conditions: Reactivity and Mutagenicity


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High Resolution Measurements of Methane and Carbon Dioxide in Surface Waters over a Natural Seep Reveal Dynamics of Dissolved Phase Air–Sea Flux

Mengran Du,* Shari Yvon-Lewis, Fenix Garcia-Tigreros, David L. Valentine, Stephanie D. Mendes, and John D. Kessler*

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Effect of Groundwater–Lake Interactions on Arsenic Enrichment in Freshwater Beach Aquifers

Jacky Lee, Clare Robinson,* and Raoul-Marie Couture

10182  [dx.doi.org/10.1021/es502147y](https://doi.org/10.1021/es502147y)

Influence of Functional Groups on Organic Aerosol Cloud Condensation Nucleus Activity

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Conversion of Chicken Feather Waste to N-Doped Carbon Nanotubes for the Catalytic Reduction of 4-Nitrophenol

Lei Gao, Ran Li, Xuelin Sui, Ren Li, Changle Chen,* and Qianwang Chen*

10198  [dx.doi.org/10.1021/es5023619](https://doi.org/10.1021/es5023619)

Background Concentrations of Polychlorinated Dibenzo-*p*-Dioxins, Dibenzofurans, and Biphenyls in the Global Oceanic Atmosphere

Laura Morales, Jordi Dachs, Belén González-Gaya, Gema Hernán, Manuela Ábalos, and Esteban Abad*

10208  [dx.doi.org/10.1021/es5024493](https://doi.org/10.1021/es5024493)

Transformation of Oxcarbazepine and Human Metabolites of Carbamazepine and Oxcarbazepine in Wastewater Treatment and Sand Filters

Elena Kaiser, Carsten Prasse, Manfred Wagner, Kathrin Bröder, and Thomas A. Ternes*

10217  [dx.doi.org/10.1021/es502515r](https://doi.org/10.1021/es502515r)

Effect of Solar Radiation on the Optical Properties and Molecular Composition of Laboratory Proxies of Atmospheric Brown Carbon

Hyun Ji (Julie) Lee, Paige Kuuipo Aiona, Alexander Laskin, Julia Laskin, and Sergey A. Nizkorodov*

10227 [dx.doi.org/10.1021/es502674s](https://doi.org/10.1021/es502674s)

Secondary Organic Aerosol Formation from Acyclic, Monocyclic, and Polycyclic Alkanes

James F. Hunter, Anthony J. Carrasquillo, Kelly E. Daumit, and Jesse H. Kroll*

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A Comprehensive Global Inventory of Atmospheric Antimony Emissions from Anthropogenic Activities, 1995–2010

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10242  [dx.doi.org/10.1021/es501337j](https://doi.org/10.1021/es501337j)

Historical Mercury Releases from Commercial Products: Global Environmental Implications

Hannah M. Horowitz,* Daniel J. Jacob, Helen M. Amos, David G. Streets, and Elsie M. Sunderland

10251  [dx.doi.org/10.1021/es502170j](https://doi.org/10.1021/es502170j)

Vapor–Wall Deposition in Chambers: Theoretical Considerations

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[dx.doi.org/10.1021/es5029074](https://doi.org/10.1021/es5029074)

Correlation of Chemical Evaporation Rate with Vapor Pressure

Donald Mackay* and Ian van Wesenbeeck

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Rapid Characterization of Naphthenic Acids Using Differential Mobility Spectrometry and Mass Spectrometry

Matthew R. Noestheden, John V. Headley, Kerry M. Peru, Mark P. Barrow, Lyle L. Burton, Takeo Sakuma, Paul Winkler, and J. Larry Campbell*

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[dx.doi.org/10.1021/es501699h](https://doi.org/10.1021/es501699h)

Quantifying Evapotranspiration from Urban Green Roofs: A Comparison of Chamber Measurements with Commonly Used Predictive Methods

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[dx.doi.org/10.1021/es502278k](https://doi.org/10.1021/es502278k)

Size-Resolved Deposition Rates for Ultrafine and Submicrometer Particles in a Residential Housing Unit

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[dx.doi.org/10.1021/es502422v](https://doi.org/10.1021/es502422v)

Nanoparticle Size Detection Limits by Single Particle ICP-MS for 40 Elements

Sungyun Lee, Xiangyu Bi, Robert B. Reed, James F. Ranville, Pierre Herckes, and Paul Westerhoff*

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Validating the Use of Performance Reference Compounds in Passive Samplers to Assess Porewater Concentrations in Sediment Beds

Jennifer N. Apell* and Philip M. Gschwend

Remediation and Control Technologies

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N-Nitrosodimethylamine Formation upon Ozonation and Identification of Precursors Source in a Municipal Wastewater Treatment Plant

Massimiliano Sgroi, Paolo Roccaro, Gregg L. Oelker, and Shane A. Snyder*

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[dx.doi.org/10.1021/es501527c](https://doi.org/10.1021/es501527c)

Respective Role of Fe and Mn Oxide Contents for Arsenic Sorption in Iron and Manganese Binary Oxide: An X-ray Absorption Spectroscopy Investigation

Gaosheng Zhang, Fudong Liu, Huijuan Liu, Jiahui Qu, and Ruiping Liu*

10323  [dx.doi.org/10.1021/es501872k](https://doi.org/10.1021/es501872k)

Phosphorus Reclamation through Hydrothermal Carbonization of Animal Manures

Steven M. Heilmann,* Joseph S. Molde, Jacobe G. Timler, Brandon M. Wood, Anthony L. Mikula, Georgiy V. Vozhdayev, Edward C. Colosky, Kurt A. Spokas, and Kenneth J. Valentas

10330  [dx.doi.org/10.1021/es502056d](https://doi.org/10.1021/es502056d)

In Situ Chemical Oxidation of Contaminated Groundwater by Persulfate: Decomposition by Fe(III)- and Mn(IV)-Containing Oxides and Aquifer Materials

Haizhou Liu, Thomas A. Bruton, Fiona M. Doyle, and David L. Sedlak*

10337  [dx.doi.org/10.1021/es502230b](https://doi.org/10.1021/es502230b)

Volatilization of Arsenic from Polluted Soil by *Pseudomonas putida* Engineered for Expression of the *arsM* Arsenic(III) S-Adenosine Methyltransferase Gene

Jian Chen, Guo-Xin Sun, Xiao-Xue Wang, Víctor de Lorenzo, Barry P. Rosen,* and Yong-Guan Zhu*

10345  [dx.doi.org/10.1021/es502290f](https://doi.org/10.1021/es502290f)

Immobilization of Polymeric g-C₃N₄ on Structured Ceramic Foam for Efficient Visible Light Photocatalytic Air Purification with Real Indoor Illumination

Fan Dong,* Zhenyu Wang, Yuhan Li, Wing-Kei Ho, and S. C. Lee

10354  [dx.doi.org/10.1021/es502585s](https://doi.org/10.1021/es502585s)

Mechanism of N₂O Formation during the Low-Temperature Selective Catalytic Reduction of NO with NH₃ over Mn–Fe Spinell

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10363  [dx.doi.org/10.1021/es502642b](https://doi.org/10.1021/es502642b)

Genome Reconstruction and Gene Expression of “*Candidatus Accumulibacter phosphatis*” Clade IB Performing Biological Phosphorus Removal

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10372  [dx.doi.org/10.1021/es502647n](https://doi.org/10.1021/es502647n)

Efficacy of Carbonaceous Materials for Sorbing Polychlorinated Biphenyls from Aqueous Solution


Bradley Beless, Hanadi S. Rifai,* and Debora F. Rodrigues

10380  [dx.doi.org/10.1021/es5028426](https://doi.org/10.1021/es5028426)

Ferrate(VI) Oxidation of β -Lactam Antibiotics: Reaction Kinetics, Antibacterial Activity Changes, and Transformation Products


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- 10390  [dx.doi.org/10.1021/es501845u](https://doi.org/10.1021/es501845u)
Immobilization of Catalase on Electrospun PVA/PA6–Cu(II) Nanofibrous Membrane for the Development of Efficient and Reusable Enzyme Membrane Reactor
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Ecotoxicology and Human Environmental Health

- 10398  [dx.doi.org/10.1021/es503026e](https://doi.org/10.1021/es503026e)
Sodium Fluoride Influences Methylation Modifications and Induces Apoptosis in Mouse Early Embryos
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- 10406  [dx.doi.org/10.1021/es501305k](https://doi.org/10.1021/es501305k)
PM_{2.5} Constituents and Hospital Emergency-Room Visits in Shanghai, China
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- 10415  [dx.doi.org/10.1021/es501914y](https://doi.org/10.1021/es501914y)
Metamorphosis Enhances the Effects of Metal Exposure on the Mayfly, *Centroptilum triangulifer*
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- 10423  [dx.doi.org/10.1021/es502419w](https://doi.org/10.1021/es502419w)
Identification of Lipidomic Biomarkers for Coexposure to Subtoxic Doses of Benzo[a]pyrene and Cadmium: The Toxicological Cascade Biomarker Approach
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- 10432  [dx.doi.org/10.1021/es5025299](https://doi.org/10.1021/es5025299)
Metabolites of Organophosphate Flame Retardants and 2-Ethylhexyl Tetrabromobenzoate in Urine from Paired Mothers and Toddlers
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- 10439  [dx.doi.org/10.1021/es502539g](https://doi.org/10.1021/es502539g)
Effects of Acute Exposure to the Non-steroidal Anti-inflammatory Drug Ibuprofen on the Developing North American Bullfrog (*Rana catesbeiana*) Tadpole
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- 10448  [dx.doi.org/10.1021/es502591p](https://doi.org/10.1021/es502591p)
Genetic Alterations and Cancer Formation in a European Flatfish at Sites of Different Contaminant Burdens
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10456  [dx.doi.org/10.1021/es502652n](https://doi.org/10.1021/es502652n)
Your Garden Hose: A Potential Health Risk Due to *Legionella* spp. Growth Facilitated by Free-Living Amoebae
Jacqueline M. Thomas,* Torsten Thomas, Richard M. Stuetz, and Nicholas J. Ashbolt


10465  [dx.doi.org/10.1021/es5026678](https://doi.org/10.1021/es5026678)
Comprehensive Investigations of Kinetics of Alkaline Hydrolysis of TNT (2,4,6-Trinitrotoluene), DNT (2,4-Dinitrotoluene), and DNAN (2,4-Dinitroanisole)
Liudmyla Sviatenko, Chad Kinney, Leonid Gorb, Frances C. Hill, Anthony J. Bednar, Sergiy Okovytyy, and Jerzy Leszczynski*

10475  [dx.doi.org/10.1021/es5027773](https://doi.org/10.1021/es5027773)
Changes in the Expression of *cyp35a* family Genes in the Soil Nematode *Caenorhabditis elegans* under Controlled Exposure to Chlorpyrifos Using Passive Dosing
Ji-Yeon Roh, Hwang Lee, and Jung-Hwan Kwon*

Energy and the Environment

10482 [dx.doi.org/10.1021/es501202e](https://doi.org/10.1021/es501202e)
Improved Hydrogen Production in the Microbial Electrolysis Cell by Inhibiting Methanogenesis Using Ultraviolet Irradiation
Yanping Hou, Haiping Luo,* Guangli Liu,* Renduo Zhang, Jiayi Li, and Shiyu Fu

10489  [dx.doi.org/10.1021/es501381h](https://doi.org/10.1021/es501381h)
Ethanol, Isobutanol, and Biohydrocarbons as Gasoline Components in Relation to Gaseous Emissions and Particulate Matter
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10497  [dx.doi.org/10.1021/es5013824](https://doi.org/10.1021/es5013824)
Evaluation of an Oil-Producing Green Alga *Chlorella* sp. C2 for Biological DeNO_x of Industrial Flue Gases
Xin Zhang, Hui Chen, Weixian Chen, Yaqin Qiao, Chenliu He, and Qiang Wang*

10505 [dx.doi.org/10.1021/es501515j](https://doi.org/10.1021/es501515j)
Statistics of Extremes in Oil Spill Risk Analysis
Zhen-Gang Ji,* Walter R. Johnson, and Geoffrey L. Wikel

10511  [dx.doi.org/10.1021/es502107s](https://doi.org/10.1021/es502107s)
Uncertainty of Oil Field GHG Emissions Resulting from Information Gaps: A Monte Carlo Approach
Kourosh Vafi and Adam R. Brandt*

10519 [dx.doi.org/10.1021/es502382h](https://doi.org/10.1021/es502382h)
Radiative Forcing Associated with Particulate Carbon Emissions Resulting from the Use of Mercury Control Technology
Guangxing Lin,* Joyce E. Penner, and Herek L. Clack

Correspondence

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[dx.doi.org/10.1021/es405415c](https://doi.org/10.1021/es405415c)

Lack of Evidence for Lower Mercury Biomagnification by Biomass Dilution in More Productive Lakes: Comment on "Mercury Biomagnification through Food Webs Is Affected by Physical and Chemical Characteristics of Lakes"
Piet Verburg*

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[dx.doi.org/10.1021/es501749j](https://doi.org/10.1021/es501749j)

Response to Comment on "Mercury Biomagnification through Food Webs Is Affected by Physical and Chemical Characteristics of Lakes"
Meredith G. Clayden,* Karen A. Kidd, Brianna Wyn, Jane L. Kirk, Derek C. G. Muir, and Nelson J. O'Driscoll

Additions and Corrections

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Correction to Health of Common Bottlenose Dolphins (*Tursiops truncatus*) in Barataria Bay, Louisiana Following the Deepwater Horizon Oil Spill

Lori H. Schwacke,* Cynthia R. Smith, Forrest I. Townsend, Randall S. Wells, Leslie B. Hart, Brian C. Balmer, Tracy K. Collier, Sylvain De Guise, Michael M. Fry, Louis J. Guillette Jr., Stephen V. Lamb, Suzanne M. Lane, Wayne E. McFee, Ned J. Place, Mandy C. Tumlin, Gina M. Ylitalo, Eric S. Zolman, and Teresa K. Rowles