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# ENVIRONMENTAL Science & Technology

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## Best Papers of 2013



Triclosan and  
Triclocarban:  
Ecological and  
Human Health  
Risks



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**ON THE COVER:** Sustainable management of water and soil resources is critical for the health of human populations and supporting ecosystems. This issue's Feature article identifies adverse impacts of the widespread use of triclosan and triclocarban, explores the underlying reason for the lack of efficacy of these antimicrobial additives of soap, and urges the design of greener, more sustainable chemical alternatives to achieve human and environmental health objectives.

## Comment

3601

[dx.doi.org/10.1021/es501134f](https://dx.doi.org/10.1021/es501134f)**ES&T's Best Papers of 2013: Under Pressure**

Jerald L. Schnoor

## Features

3603

[dx.doi.org/10.1021/es500495p](https://dx.doi.org/10.1021/es500495p)**On the Need and Speed of Regulating Triclosan and Triclocarban in the United States**

Rolf U. Halden\*

The polychlorinated aromatic antimicrobials triclosan and triclocarban are in widespread use for killing microorganisms indiscriminately, rapidly, and by nonspecific action. While their utility in healthcare settings is undisputed, benefits to users of antimicrobial personal care products are few to none. Yet, these latter, high-volume uses have caused widespread contamination of the environment, wildlife, and human populations. This feature article presents a timeline of scientific evidence and regulatory actions in the U.S. concerning persistent polychlorinated biocides, showing a potential path forward to judicious and sustainable uses of synthetic antimicrobials, including the design of greener and safer next-generation alternatives. The polychlorinated aromatic antimicrobials triclosan and triclocarban are in widespread use for killing microorganisms indiscriminately, rapidly, and by nonspecific action. While their utility in healthcare settings is undisputed, benefits to users of antimicrobial personal care products are few to none. Yet, these latter, high-volume uses have caused widespread contamination of the environment, wildlife, and human populations. This feature article presents a timeline of scientific evidence and regulatory actions in the U.S. concerning persistent polychlorinated biocides, showing a potential path forward to judicious and sustainable uses of synthetic antimicrobials, including the design of greener and safer next-generation alternatives.

## Critical Reviews

3612

[dx.doi.org/10.1021/es4038676](https://dx.doi.org/10.1021/es4038676)**Rejection of Trace Organic Compounds by Forward Osmosis Membranes: A Literature Review**

Bryan D. Coday, Bethany G. M. Yaffe, Pei Xu, and Tzahi Y. Cath\*

## Policy Analysis

3625  [dx.doi.org/10.1021/es500052h](https://doi.org/10.1021/es500052h)

**Systematic Exploration of Efficient Strategies to Manage Solid Waste in U.S. Municipalities: Perspectives from the Solid Waste Optimization Life-Cycle Framework (SWOLF)**

James W. Levis,\* Morton A. Barlaz, Joseph F. DeCarolis, and S. Ranji Ranjithan

3632  [dx.doi.org/10.1021/es405117n](https://doi.org/10.1021/es405117n)

**Relationship between Urbanization and CO<sub>2</sub> Emissions Depends on Income Level and Policy**

Diego Ponce de Leon Barido and Julian D. Marshall\*

3640  [dx.doi.org/10.1021/es403473x](https://doi.org/10.1021/es403473x)

**Informed Public Choices for Low-Carbon Electricity Portfolios Using a Computer Decision Tool**

Lauren A. (Fleishman) Mayer,\* Wändi Bruine de Bruin, and M. Granger Morgan


## Articles

### Characterization of Natural and Affected Environments

3649  [dx.doi.org/10.1021/es405313r](https://doi.org/10.1021/es405313r)

**Identification of Synthetic Steroids in River Water Downstream from Pharmaceutical Manufacture Discharges Based on a Bioanalytical Approach and Passive Sampling**

Nicolas Creusot, Selim Ait-Aïssa,\* Nathalie Tapie, Patrick Pardon, François Brion, Wilfried Sanchez, Eric Thybaud, Jean-Marc Porcher, and Hélène Budzinski

3658  [dx.doi.org/10.1021/es404974e](https://doi.org/10.1021/es404974e)

**Local Structure and Speciation of Platinum in Fresh and Road-Aged North American Sourced Vehicle Emissions Catalysts: An X-ray Absorption Spectroscopic Study**

Peter W. Ash, David A. Boyd, Timothy I. Hyde,\* Jonathan L. Keating, Gabriele Randlshofer, Klaus Rothenbacher, Gopinathan Sankar,\* James J. Schauer, Martin M. Shafer, and Brandy M. Toner

3666  [dx.doi.org/10.1021/es4046549](https://doi.org/10.1021/es4046549)

**Identification of Multiple Mercury Sources to Stream Sediments near Oak Ridge, TN, USA**

Patrick M. Donovan,\* Joel D. Blum, Jason D. Demers, Baohua Gu, Scott C. Brooks, and John Peryam

3675  [dx.doi.org/10.1021/es4050264](https://doi.org/10.1021/es4050264)

**Airborne Trifluoroacetic Acid and Its Fraction from the Degradation of HFC-134a in Beijing, China**

Jing Wu, Jonathan W. Martin, Zihan Zhai, Keding Lu, Li Li, Xuekun Fang, Hangbiao Jin, Jianxin Hu, and Jianbo Zhang\*

3682  [dx.doi.org/10.1021/es4051956](https://doi.org/10.1021/es4051956)

**Impact of Physical Properties on Ozone Removal by Several Porous Materials**

Elliott T. Gall, Richard L. Corsi, and Jeffrey A. Siegel\*

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[dx.doi.org/10.1021/es405294s](https://doi.org/10.1021/es405294s)

**Isotopic Compositions of  $^{236}\text{U}$  and Pu Isotopes in "Black Substances" Collected from Roadsides in Fukushima Prefecture: Fallout from the Fukushima Dai-ichi Nuclear Power Plant Accident**

Aya Sakaguchi,\* Peter Steier, Yoshio Takahashi, and Masayoshi Yamamoto

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[dx.doi.org/10.1021/es405375j](https://doi.org/10.1021/es405375j)

**Lubricating Oil Dominates Primary Organic Aerosol Emissions from Motor Vehicles**

David R. Worton,\* Gabriel Isaacman, Drew R. Gentner, Timothy R. Dallmann, Arthur W. H. Chan, Christopher Ruehl, Thomas W. Kirchstetter, Kevin R. Wilson, Robert A. Harley, and Allen H. Goldstein

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[dx.doi.org/10.1021/es4054835](https://doi.org/10.1021/es4054835)

**Genome Sequencing Reveals the Environmental Origin of Enterococci and Potential Biomarkers for Water Quality Monitoring**

Michael R. Weigand, Nicholas J. Ashbolt, Konstantinos T. Konstantinidis,\* and Jorge W. Santo Domingo\*

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[dx.doi.org/10.1021/es405701f](https://doi.org/10.1021/es405701f)

**Mass Balance Approaches to Characterizing the Leaching Potential of Trenbolone Acetate Metabolites in Agro-Ecosystems**

Gerrard D. Jones, Peter V. Benchetler, Kenneth W. Tate, and Edward P. Kolodziej\*

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[dx.doi.org/10.1021/es500212a](https://doi.org/10.1021/es500212a)

**Incorporation of Uranium into Hematite during Crystallization from Ferrihydrite**

Timothy A. Marshall, Katherine Morris, Gareth T. W. Law, Francis R. Livens, J. Frederick W. Mosselmans, Pieter Bots, and Samuel Shaw\*

## Environmental Processes

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[dx.doi.org/10.1021/es403209z](https://doi.org/10.1021/es403209z)

**From the City to the Lake: Loadings of PCBs, PBDEs, PAHs and PCMs from Toronto to Lake Ontario**

Lisa Melymuk, Matthew Robson, Susan A. Csiszar, Paul A. Helm, Georgina Kaltenecker, Sean Backus, Lisa Bradley, Beth Gilbert, Pierrette Blanchard, Liisa Jantunen, and Miriam L. Diamond\*

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[dx.doi.org/10.1021/es403358v](https://doi.org/10.1021/es403358v)

**Abiotic Process for Fe(II) Oxidation and Green Rust Mineralization Driven by a Heterotrophic Nitrate Reducing Bacteria (*Klebsiella mobilis*)**








Marjorie Etique, Frédéric P. A. Jorand,\* Asfaw Zegeye, Brian Grégoire, Christelle Despas, and Christian Ruby


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[dx.doi.org/10.1021/es403695r](https://doi.org/10.1021/es403695r)


**pH-Dependent Transport of Metal Cations in Porous Media**

Valentina Prigiobbe\* and Steven L. Bryant


- 3760  [dx.doi.org/10.1021/es403787u](https://doi.org/10.1021/es403787u)  
**Molecular Evidence of Heavy-Oil Weathering Following the M/V Cosco Busan Spill: Insights from Fourier Transform Ion Cyclotron Resonance Mass Spectrometry**  
Karin L. Lemkau,\* Amy M. McKenna, David C. Podgorski, Ryan P. Rodgers, and Christopher M. Reddy
- 3768  [dx.doi.org/10.1021/es5003692](https://doi.org/10.1021/es5003692)  
**Uranium Reduction by *Shewanella oneidensis* MR-1 as a Function of NaHCO<sub>3</sub> Concentration: Surface Complexation Control of Reduction Kinetics**  
Ling Sheng\* and Jeremy B. Fein
- 3776  [dx.doi.org/10.1021/es4044769](https://doi.org/10.1021/es4044769)  
**Dehalogenation of Chlorobenzenes, Dichlorotoluenes, and Tetrachloroethene by Three *Dehalobacter* spp.**  
Jennifer L. Nelson, Jiandong Jiang, and Stephen H. Zinder\*
- 3783  [dx.doi.org/10.1021/es4045506](https://doi.org/10.1021/es4045506)  
**Metal Transport in the Boreal Landscape—The Role of Wetlands and the Affinity for Organic Matter**  
Fredrik Lidman,\* Stephan J. Köhler, Carl-Magnus Mörh, and Hjalmar Laudon
- 3791  [dx.doi.org/10.1021/es404705d](https://doi.org/10.1021/es404705d)  
**Does Water Content or Flow Rate Control Colloid Transport in Unsaturated Porous Media?**  
Thorsten Knappenberger,\* Markus Flury, Earl D. Mattson, and James B. Harsh
- 3800  [dx.doi.org/10.1021/es404886x](https://doi.org/10.1021/es404886x)  
**Measurements and Modeling of Deposited Particle Transport by Foot Traffic Indoors**  
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- 3808  [dx.doi.org/10.1021/es404961w](https://doi.org/10.1021/es404961w)  
**Airborne Plutonium and Non-Natural Uranium from the Fukushima DNPP Found at 120 km Distance a Few Days after Reactor Hydrogen Explosions**  
Taeko Shinonaga,\* Peter Steier, Markus Lagos, and Takehisa Ohkura
- 3815  [dx.doi.org/10.1021/es4051764](https://doi.org/10.1021/es4051764)  
**Geochemical Production of Reactive Oxygen Species From Biogeochemically Reduced Fe**  
Sarah A. Murphy, Benson M. Solomon, Shengnan Meng, Justin M. Copeland, Timothy J. Shaw, and John L. Ferry\*
- 3822  [dx.doi.org/10.1021/es405221z](https://doi.org/10.1021/es405221z)  
**Arsenite Binding to Sulfhydryl Groups in the Absence and Presence of Ferrihydrite: A Model Study**  
Martin Hoffmann, Christian Mikutta,\* and Ruben Kretzschmar


3832  [dx.doi.org/10.1021/es405353h](https://doi.org/10.1021/es405353h)  
**Selective Reactivity of Monochloramine with Extracellular Matrix Components Affects the Disinfection of Biofilm and Detached Clusters**  
Zheng Xue, Woo Hyoung Lee, Kimberly M. Coburn, and Youngwoo Seo\*

3840  [dx.doi.org/10.1021/es405364m](https://doi.org/10.1021/es405364m)  
**Vertical Distributions of Radionuclides ( $^{239+240}\text{Pu}$ ,  $^{240}\text{Pu}/^{239}\text{Pu}$ , and  $^{137}\text{Cs}$ ) in Sediment Cores of Lake Bosten in Northwestern China**  
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3847  [dx.doi.org/10.1021/es405632v](https://doi.org/10.1021/es405632v)  
**Elevated Levels of Polychlorinated Biphenyls in Plants, Air, and Soils at an E-Waste Site in Southern China and Enantioselective Biotransformation of Chiral PCBs in Plants**  
She-Jun Chen, Mi Tian, Jing Zheng, Zhi-Cheng Zhu, Yong Luo, Xiao-Jun Luo, and Bi-Xian Mai\*

3856  [dx.doi.org/10.1021/es405683d](https://doi.org/10.1021/es405683d)  
**Catalytic Effects of Functionalized Carbon Nanotubes on Dehydrochlorination of 1,1,2,2-Tetrachloroethane**  
Weifeng Chen, Dongqiang Zhu, Shourong Zheng, and Wei Chen\*

3864  [dx.doi.org/10.1021/es4057467](https://doi.org/10.1021/es4057467)  
**Highly Elevated Serum Concentrations of Perfluoroalkyl Substances in Fishery Employees from Tangxun Lake, China**  
Zhen Zhou, Yali Shi, Robin Vestergren, Thanh Wang, Yong Liang,\* and Yaqi Cai\*


3875  [dx.doi.org/10.1021/es500013j](https://doi.org/10.1021/es500013j)  
**Photoreactivity of Unfunctionalized Single-Wall Carbon Nanotubes Involving Hydroxyl Radical: Chiral Dependency and Surface Coating Effect**  
Wen-Che Hou,\* Somayeh BeigzadehMilani, Chad T. Jafvert, and Richard G. Zepp\*

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3883  [dx.doi.org/10.1021/es404603g](https://doi.org/10.1021/es404603g)  
**Colloid Filtration in Surface Dense Vegetation: Experimental Results and Theoretical Predictions**  
Lei Wu, Rafael Muñoz-Carpena,\* Bin Gao,\* Wen Yang, and Yakov A. Pachepsky


3891  [dx.doi.org/10.1021/es405323p](https://doi.org/10.1021/es405323p)  
**Sunlight Inactivation of MS2 Coliphage in the Absence of Photosensitizers: Modeling the Endogenous Inactivation Rate Using a Photoaction Spectrum**  
Mi T. Nguyen, Andrea I. Silverman, and Kara L. Nelson\*


3899  [dx.doi.org/10.1021/es405387c](https://doi.org/10.1021/es405387c)  
**Molecular Dynamics Simulations of Uranyl and Uranyl Carbonate Adsorption at Aluminosilicate Surfaces**  
Sebastien Kerisit\* and Chongxuan Liu

3908  [dx.doi.org/10.1021/es405468p](https://doi.org/10.1021/es405468p)  
**Pre-site Characterization Risk Analysis for Commercial-Scale Carbon Sequestration**  
Zhenxue Dai,\* Philip H. Stauffer,\* J. William Carey, Richard S. Middleton, Zhiming Lu, John F. Jacobs, Ken Hnottavange-Telleen, and Lee H. Spangler


3916  [dx.doi.org/10.1021/es405592h](https://doi.org/10.1021/es405592h)  
**Modeling of Nitrous Oxide Production by Autotrophic Ammonia-Oxidizing Bacteria with Multiple Production Pathways**  
Bing-Jie Ni,\* Lai Peng, Yingyu Law, Jianhua Guo, and Zhiguo Yuan\*

## Environmental Measurements Methods


3925  [dx.doi.org/10.1021/es404475c](https://doi.org/10.1021/es404475c)  
**Calculating the Diffusive Flux of Persistent Organic Pollutants between Sediments and the Water Column on the Palos Verdes Shelf Superfund Site Using Polymeric Passive Samplers**  
Loretta A. Fernandez,\* Wenjian Lao, Keith A. Maruya, and Robert M. Burgess

3935  [dx.doi.org/10.1021/es404584b](https://doi.org/10.1021/es404584b)  
**Rapid Multisample Analysis for Simultaneous Determination of Anthropogenic Radionuclides in Marine Environment**  
Jixin Qiao,\* Keliang Shi, Xiaolin Hou, Sven Nielsen, and Per Roos

3943  [dx.doi.org/10.1021/es4047704](https://doi.org/10.1021/es4047704)  
**On-Road Ammonia Emissions Characterized by Mobile, Open-Path Measurements**  
Kang Sun, Lei Tao, David J. Miller, M. Amir Khan, and Mark A. Zondlo\*

3951  [dx.doi.org/10.1021/es404596q](https://doi.org/10.1021/es404596q)  
**Life Cycle Inventory of the Production of Rare Earths and the Subsequent Production of NdFeB Rare Earth Permanent Magnets**  
Benjamin Sprecher,\* Yanping Xiao, Allan Walton, John Speight, Rex Harris, Rene Kleijn, Geert Visser, and Gert Jan Kramer

3959  [dx.doi.org/10.1021/es405269q](https://doi.org/10.1021/es405269q)  
**Semivolatile Organic Compounds in Indoor Air and Settled Dust in 30 French Dwellings**  
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3970  [dx.doi.org/10.1021/es404610t](https://doi.org/10.1021/es404610t)  
**High Density Ozone Monitoring Using Gas Sensitive Semi-Conductor Sensors in the Lower Fraser Valley, British Columbia**  
Mark Bart, David E Williams, Bruce Ainslie, Ian McKendry,\* Jennifer Salmond, Stuart K. Grange, Maryam Alavi-Shoshitari, Douw Steyn, and Geoff S. Henshaw

## Remediation and Control Technologies

3978  [dx.doi.org/10.1021/es405143u](https://doi.org/10.1021/es405143u)

**Selective Oxidation of Arsenite by Peroxymonosulfate with High Utilization Efficiency of Oxidant**  
Zhaohui Wang,\* Richard T. Bush, Leigh A. Sullivan, Chuncheng Chen,\* and Jianshe Liu

3986  [dx.doi.org/10.1021/es404418a](https://doi.org/10.1021/es404418a)

**Immobilization of Mercury by Carboxymethyl Cellulose Stabilized Iron Sulfide Nanoparticles: Reaction Mechanisms and Effects of Stabilizer and Water Chemistry**  
Yanyan Gong, Yuanyuan Liu, Zhong Xiong, and Dongye Zhao\*

3995 [dx.doi.org/10.1021/es404926g](https://doi.org/10.1021/es404926g)

**Pilot Tests on the Catalytic Filtration of Dioxins**  
Pao Chen Hung, Shu Hao Chang, Syuan Hong Lin, Alfons Buekens, and Moo Been Chang\*

4002  [dx.doi.org/10.1021/es405622d](https://doi.org/10.1021/es405622d)

**Effects of Metal Ions on the Reactivity and Corrosion Electrochemistry of Fe/FeS Nanoparticles**  
Eun-Ju Kim, Jae-Hwan Kim, Yoon-Seok Chang,\* David Turcio-Ortega, and Paul G. Tratnyek\*

4012  [dx.doi.org/10.1021/es4057483](https://doi.org/10.1021/es4057483)

**Biotransformation of 6:2 Fluorotelomer Alcohol (6:2 FTOH) by a Wood-Rotting Fungus**  
Nancy Tseng, Ning Wang, Bogdan Szostek, and Shaily Mahendra\*

4021  [dx.doi.org/10.1021/es4057906](https://doi.org/10.1021/es4057906)

**Microbial Metabolism and Community Structure in Response to Bioelectrochemically Enhanced Remediation of Petroleum Hydrocarbon-Contaminated Soil**  
Lu Lu, Tyler Huggins, Song Jin, Yi Zuo, and Zhiyong Jason Ren\*

4030 [dx.doi.org/10.1021/es500001q](https://doi.org/10.1021/es500001q)

**Arsenite Oxidation Initiated by the UV Photolysis of Nitrite and Nitrate**  
Dong-hyo Kim, Jaesang Lee, Jung-ho Ryu, Kitae Kim, and Wonyong Choi\*

4038  [dx.doi.org/10.1021/es4055725](https://doi.org/10.1021/es4055725)

**Differential Resistance of Drinking Water Bacterial Populations to Monochloramine Disinfection.**  
Tzu-Hsin Chiao, Tara M. Clancy, Ameet Pinto, Chuanwu Xi, and Lutgarde Raskin\*



## Sustainability Engineering and Green Chemistry

4048  [dx.doi.org/10.1021/es404646e](https://doi.org/10.1021/es404646e)

**Nanosized Carbon Black Combined with Ni<sub>2</sub>O<sub>3</sub> as “Universal” Catalysts for Synergistically Catalyzing Carbonization of Polyolefin Wastes to Synthesize Carbon Nanotubes and Application for Supercapacitors**

Xin Wen, Xuecheng Chen, Nana Tian, Jiang Gong, Jie Liu, Mark H. Rummeli, Paul K. Chu, Ewa Mijowska, and Tao Tang\*

4056  [dx.doi.org/10.1021/es404995f](https://doi.org/10.1021/es404995f)

**Historical Emissions of HFC-23 (CHF<sub>3</sub>) in China and Projections upon Policy Options by 2050**

Xuekun Fang, Benjamin R. Miller, ShenShen Su, Jing Wu, Jianbo Zhang, and Jianxin Hu\*

4063  [dx.doi.org/10.1021/es405167f](https://doi.org/10.1021/es405167f)

**Prioritizing Environmental Justice and Equality: Diesel Emissions in Southern California**

Julian D. Marshall,\* Kathryn R. Swor, and Nam P. Nguyen

4069  [dx.doi.org/10.1021/es500189f](https://doi.org/10.1021/es500189f)

**Life Cycle Assessment of Domestic and Agricultural Rainwater Harvesting Systems**

Santosh R. Ghimire, John M. Johnston,\* Wesley W. Ingwersen, and Troy R. Hawkins

## Ecotoxicology and Human Environmental Health

4078  [dx.doi.org/10.1021/es500278f](https://doi.org/10.1021/es500278f)

**Induced Tolerance from a Sublethal Insecticide Leads to Cross-Tolerance to Other Insecticides**

Jessica Hua,\* Devin K. Jones, and Rick A. Relyea

4086  [dx.doi.org/10.1021/es404359v](https://doi.org/10.1021/es404359v)

**Modification of Fatty Acids in Membranes of Bacteria: Implication for an Adaptive Mechanism to the Toxicity of Carbon Nanotubes**

Baotong Zhu, Xinghui Xia,\* Na Xia, Shangwei Zhang, and Xuejun Guo

4096 [dx.doi.org/10.1021/es405331c](https://doi.org/10.1021/es405331c)

**Lethal and Sublethal Effects of Imidacloprid, After Chronic Exposure, On the Insect Model *Drosophila melanogaster***

Gaël Charpentier, Fanny Louat, Jean-Marc Bonmatin,\* Patrice A. Marchand, Fanny Vanier, Daniel Locker, and Martine Decoville

4103  [dx.doi.org/10.1021/es405450n](https://doi.org/10.1021/es405450n)

**Widespread Occurrence of Benzophenone-Type UV Light Filters in Personal Care Products from China and the United States: An Assessment of Human Exposure**

Chunyang Liao and Kurunthachalam Kannan\*

4110  [dx.doi.org/10.1021/es405524b](https://doi.org/10.1021/es405524b)

**Transcriptional and Epigenetic Mechanisms Underlying Enhanced In Vitro Adipocyte Differentiation by the Brominated Flame Retardant BDE-47**


Jorke H. Kamstra, Eva Hrubá, Bruce Blumberg, Amanda Janesick, Susanne Mandrup, Timo Hamers, and Juliette Legler\*

4120  [dx.doi.org/10.1021/es4055516](https://doi.org/10.1021/es4055516)

**Polycyclic Aromatic Hydrocarbons-Associated MicroRNAs and Their Interactions with the Environment: Influences on Oxidative DNA Damage and Lipid Peroxidation in Coke Oven Workers**

Qifei Deng, Xiayun Dai, Huan Guo, Suli Huang, Dan Kuang, Jing Feng, Tian Wang, Wangzhen Zhang, Kun Huang, Die Hu, Huaxin Deng, Xiaomin Zhang, and Tangchun Wu\*

## Energy and the Environment

4129  [dx.doi.org/10.1021/es4037012](https://doi.org/10.1021/es4037012)

**Nanofiber Supported Thin-Film Composite Membrane for Pressure-Retarded Osmosis**

Nhu-Ngoc Bui and Jeffrey R. McCutcheon\*

4137  [dx.doi.org/10.1021/es404458j](https://doi.org/10.1021/es404458j)

**Life Cycle Water Footprints of Nonfood Biomass Fuels in China**

Tingting Zhang, Xiaomin Xie,\* and Zhen Huang

4145  [dx.doi.org/10.1021/es404872w](https://doi.org/10.1021/es404872w)

**Activation Rate of Magnesium Sulfite Catalyzed by Cobalt Ions**

Li Qiangwei, Wang Lidong,\* Zhao Yi, Ma Yongliang,\* Cui Shuai, Liu Shuang, Xu Peiyao, and Hao Jiming

4153  [dx.doi.org/10.1021/es405034y](https://doi.org/10.1021/es405034y)

**Naphthenic Acids in Coastal Sediments after the Hebei Spirit Oil Spill: A Potential Indicator for Oil Contamination**

Yi Wan, Beili Wang, Jong Seong Khim,\* Seongjin Hong, Won Joon Shim, and Jianying Hu\*

4163  [dx.doi.org/10.1021/es405036m](https://doi.org/10.1021/es405036m)

**CO<sub>2</sub> Absorption and Desorption in an Aqueous Solution of Heavily Hindered Alkanolamine: Structural Elucidation of CO<sub>2</sub>-Containing Species**

Young-Seop Choi, Jinkyu Im, Jun Kyo Jeong, Sung Yun Hong, Ho Gyeom Jang, Minserk Cheong, Je Seung Lee,\* and Hoon Sik Kim\*

4171  [dx.doi.org/10.1021/es405044w](https://doi.org/10.1021/es405044w)

**Criticality of Iron and Its Principal Alloying Elements**

Philip Nuss,\* E. M. Harper, N. T. Nassar, Barbara K. Reck, and T. E. Graedel

4178  [dx.doi.org/10.1021/es405150p](https://doi.org/10.1021/es405150p)

**Novel Functionality of Organic 6,13-Pentacenequinone as a Photocatalyst for Hydrogen Production under Solar Light**

Vikram U. Pandit, Sudhir S. Arbuji, Uttam P. Mulik, and Bharat B. Kale\*

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[dx.doi.org/10.1021/es405521k](https://doi.org/10.1021/es405521k)

**Kinetic Modeling of Inherent Mineral Catalyzed NO Reduction by Biomass Char**

X. Y. Wu, Q. Song,\* H. B. Zhao, Z. H. Zhang, and Q. Yao

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[dx.doi.org/10.1021/es5002506](https://doi.org/10.1021/es5002506)

**Accelerated OH<sup>-</sup> Transport in Activated Carbon Air Cathode by Modification of Quaternary Ammonium for Microbial Fuel Cells**

Xin Wang, Cuijuan Feng, Ning Ding, Qingrui Zhang, Nan Li, Xiaojing Li, Yueyong Zhang, and Qixing Zhou\*

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[dx.doi.org/10.1021/es500737m](https://doi.org/10.1021/es500737m)

**A Two-Stage Microbial Fuel Cell and Anaerobic Fluidized Bed Membrane Bioreactor (MFC-AFMBR) System for Effective Domestic Wastewater Treatment**

Lijiao Ren, Yongtae Ahn, and Bruce E. Logan\*

## Correspondence

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[dx.doi.org/10.1021/es500134b](https://doi.org/10.1021/es500134b)

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

Lucinda A. Jacobs\*

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**Response to Comment on 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

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**Osmotic Pressure versus Swelling Pressure: Comment on "Bifunctional Polymer Hydrogel Layers As Forward Osmosis Draw Agents for Continuous Production of Fresh Water Using Solar Energy"**

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Huangting Wang,\* Jing Wei, and George P. Simon


## Additions and Corrections

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**Correction to "Comparative Transcriptomic Responses to Chronic Cadmium, Fluoranthene, and Atrazine Exposure in *Lumbricus rubellus*"**

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