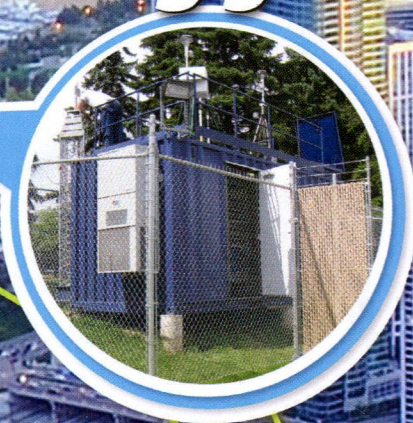


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# ENVIRONMENTAL Science & Technology

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## The Changing Paradigm of Air Monitoring



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**ON THE COVER:** Recent advances in air pollution monitoring technology now allow for traditional systems to be supplemented and coupled with newer system types (mobile, handheld), offering greater flexibility in applications. From source monitoring to personal exposure, these technologies, combined with enhanced networking and visualization capabilities have the potential to change the way industry, government, and individuals monitor, report and respond to air pollution.

## Features

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### The Changing Paradigm of Air Pollution Monitoring

Emily G. Snyder,\* Timothy H. Watkins, Paul A. Solomon, Eben D. Thoma, Ronald W. Williams, Gayle S. W. Hagler, David Shelow, David A. Hindin, Vasu J. Kilaru, and Peter W. Preuss

The air pollution monitoring paradigm is rapidly changing due to recent advances in (1) the development of portable, lower-cost air pollution sensors reporting data in near-real time at a high-time resolution, (2) increased computational and visualization capabilities, and (3) wireless communication/infrastructure. It is possible that these advances can support traditional air quality monitoring by supplementing ambient air monitoring and enhancing compliance monitoring. Sensors are beginning to provide individuals and communities the tools needed to understand their environmental exposures with these data individual and community-based strategies can be developed to reduce pollution exposure as well as understand linkages to health indicators. Each of these areas as well as corresponding challenges (e.g., quality of data) and potential opportunities associated with development and implementation of air pollution sensors are discussed. The air pollution monitoring paradigm is rapidly changing due to recent advances in (1) the development of portable, lower-cost air pollution sensors reporting data in near-real time at a high-time resolution, (2) increased computational and visualization capabilities, and (3) wireless communication/infrastructure. It is possible that these advances can support traditional air quality monitoring by supplementing ambient air monitoring and enhancing compliance monitoring. Sensors are beginning to provide individuals and communities the tools needed to understand their environmental exposures with these data individual and community-based strategies can be developed to reduce pollution exposure as well as understand linkages to health indicators. Each of these areas as well as corresponding challenges (e.g., quality of data) and potential opportunities associated with development and implementation of air pollution sensors are discussed.

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### A Way to Curb Phosphorus Toxicity in the Environment: Use of Polyphosphate Reservoir of Cyanobacteria and Microalga as a Safe Alternative Phosphorus Biofertilizer for Indian Agriculture

Krishna Ray,\* Chandan Mukherjee, and Amar Nath Ghosh

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[dx.doi.org/10.1021/es4039177](http://dx.doi.org/10.1021/es4039177)

### Balancing of Ocean Acidification by Superoxide Redox Chemistry?

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### **Interspecies Correlation Estimation—Applications in Water Quality Criteria and Ecological Risk Assessment**

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11449  [dx.doi.org/10.1021/es402950q](https://doi.org/10.1021/es402950q)

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11457  [dx.doi.org/10.1021/es403029m](https://doi.org/10.1021/es403029m)

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11473  [dx.doi.org/10.1021/es4026744](https://doi.org/10.1021/es4026744)

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11522  [dx.doi.org/10.1021/es401968c](https://doi.org/10.1021/es401968c)  
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11528  [dx.doi.org/10.1021/es402075f](https://doi.org/10.1021/es402075f)  
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11537  [dx.doi.org/10.1021/es4022415](https://doi.org/10.1021/es4022415)  
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11545  [dx.doi.org/10.1021/es402446v](https://doi.org/10.1021/es402446v)  
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11584  [dx.doi.org/10.1021/es402840g](https://doi.org/10.1021/es402840g)  
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11592 [dx.doi.org/10.1021/es403368j](https://doi.org/10.1021/es403368j)  
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11607  [dx.doi.org/10.1021/es4013849](https://doi.org/10.1021/es4013849)  
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11616  [dx.doi.org/10.1021/es401499q](https://doi.org/10.1021/es401499q)  
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11717  [dx.doi.org/10.1021/es402508k](https://doi.org/10.1021/es402508k)

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11726  [dx.doi.org/10.1021/es402879x](https://doi.org/10.1021/es402879x)

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11739  [dx.doi.org/10.1021/es402618m](https://doi.org/10.1021/es402618m)

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**Molecular Toxicity Identification Evaluation (mTIE) Approach Predicts Chemical Exposure in *Daphnia magna***

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11766  [dx.doi.org/10.1021/es401609n](https://doi.org/10.1021/es401609n)

**Limited Waterborne Acute Toxicity of Native Polycyclic Aromatic Compounds from Coals of Different Types Compared to Their Total Hazard Potential**

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11776  [dx.doi.org/10.1021/es402204y](https://doi.org/10.1021/es402204y)

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Craig E. Hebert,\* David Campbell, Rhona Kindopp, Stuart MacMillan, Pamela Martin, Ewa Neugebauer, Lucy Patterson, and Jeff Shatford

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[dx.doi.org/10.1021/es4029364](https://doi.org/10.1021/es4029364)

**Effects of HO-/MeO-PBDEs on Androgen Receptor: In Vitro Investigation and Helix 12-Involved MD Simulation**

Xiaoxiang Wang, Huaiyu Yang, Xinxin Hu, Xiaowei Zhang, Qiansen Zhang, Hualiang Jiang, Wei Shi,\* and Hongxia Yu\*

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**A Hybrid Microbial Fuel Cell Membrane Bioreactor with a Conductive Ultrafiltration Membrane Biocathode for Wastewater Treatment**

Lilian Malaeb, Krishna P. Katuri, Bruce E. Logan, Husnul Maab, S. P. Nunes, and Pascal E. Saikaly\*

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[dx.doi.org/10.1021/es4013855](https://doi.org/10.1021/es4013855)

**Life Cycle Water Consumption for Shale Gas and Conventional Natural Gas**

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[dx.doi.org/10.1021/es401470e](https://doi.org/10.1021/es401470e)

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[dx.doi.org/10.1021/es402165b](https://doi.org/10.1021/es402165b)

**Impacts of Shale Gas Wastewater Disposal on Water Quality in Western Pennsylvania**

Nathaniel R. Warner,\* Cidney A. Christie, Robert B. Jackson, and Avner Vengosh\*

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[dx.doi.org/10.1021/es402199e](https://doi.org/10.1021/es402199e)


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**Mapping the Global Journey of Anthropogenic Aluminum: A Trade-Linked Multilevel Material Flow Analysis**

Gang Liu\* and Daniel B. Müller

11882 [dx.doi.org/10.1021/es402354y](https://doi.org/10.1021/es402354y)

**Effects of Gaseous Sulphuric Acid on Diesel Exhaust Nanoparticle Formation and Characteristics**

Topi Rönkkö,\* Tero Lähde, Juha Heikkilä, Liisa Pirjola, Ulrike Bauschke, Frank Arnold, Hans Schlager, Dieter Rothe, Jaakko Yli-Ojanperä, and Jorma Keskinen

11890  [dx.doi.org/10.1021/es402686z](https://doi.org/10.1021/es402686z)

**Influence of Mileage Accumulation on the Particle Mass and Number Emissions of Two Gasoline Direct Injection Vehicles**

M. Matti Marica,\* Joseph J. Szente, Jack Adams, Paul Tennon, and Todd Rumpsa

11897  [dx.doi.org/10.1021/es402933b](https://doi.org/10.1021/es402933b)

**Free Nitrous Acid (FNA)-Based Pretreatment Enhances Methane Production from Waste Activated Sludge**

Qiin Wang, Liu Ye, Guangming Jiang, Paul D. Jensen, Damien J. Batstone, and Zhiguo Yuan\*

## Correspondence

11905 [dx.doi.org/10.1021/es4034099](https://doi.org/10.1021/es4034099)

**Comment on “Evolution of the Macondo Well Blowout: Simulating the Effects of the Circulation and Synthetic Dispersants on the Subsea Oil Transport”**

E. Eric Adams,\* Scott A. Socolofsky, and Michel Boufadel

11906 [dx.doi.org/10.1021/es404183y](https://doi.org/10.1021/es404183y)

**Response to Comment on “Evolution of the Macondo Well Blowout: Simulating the Effects of the Circulation and Synthetic Dispersants on the Subsea Oil Transport”**

Zachary M. Aman and Claire B. Paris\*

11908 [dx.doi.org/10.1021/es403417a](https://doi.org/10.1021/es403417a)

**Comment on “Modeling Nitrous Oxide Production during Biological Nitrogen Removal via Nitrification and Denitrification: Extensions to the General ASM Models”**

Jun Wu\*

11910 [dx.doi.org/10.1021/es404125v](https://doi.org/10.1021/es404125v)

**Reply to Comment on “Modeling Nitrous Oxide Production during Biological Nitrogen Removal via Nitrification and Denitrification: Extensions to the General ASM Models”**

Bing-Jie Ni, Maël Ruscallada, Carles Pellicer-Nàcher, and Barth F. Smets\*

## Additions and Corrections

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**Correction to Normalized Diurnal and Between-Day Trends in Illicit and Legal Drug Loads that Account for Changes in Population**

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**Correction to Oxidation of Cu(I) in Seawater at Low Oxygen Concentrations**

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**Correction to First Determination of UV Filters in Marine Mammals. Octocrylene Levels in Franciscana Dolphins**

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