

## Contents in Context

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#### **Flow Analysis Techniques for Spatial and Temporal Measurement of Nutrients in Aquatic Systems**

*S. Gray, G. Hanrahan, I. McKelvie, A. Tappin, F. Tse, P. Worsfold*

*Environ. Chem. 2006, 3, 3*

Eutrophication is a growing problem globally, and it has significant ecological and socio-economic consequences. Understanding the causes of eutrophication requires a knowledge of nutrient biogeochemistry in aquatic systems. Owing to the high spatial and temporal variability of nutrients in these systems, there is a need for autonomous *in situ* measurement techniques with rapid response and the ability to collect long-term data. Flow injection analysis is one technique that meets these demands.

#### **On-line Removal of Sulfide Interference in Phosphate Determination by Flow Injection Analysis**

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*Environ. Chem. 2006, 3, 19*

Effective management of eutrophication and resultant major algal blooms requires accurate assessment of the importance of internal (sediment-based) as well as external, sources of phosphorus to susceptible aquatic ecosystems. The high spatial variability in pore water filterable reactive phosphorus (FRP) necessitates extensive sampling, and rapid flow injection methods overcome many of the difficulties in maintaining sample integrity. A simple flow injection manifold has been developed to prevent major sulfide interference with FRP determination and therefore enable accurate phosphate measurements.

#### **The Potentials of the Third Generation of Flow Injection Analysis for Nutrient Monitoring and Fractionation Analysis**

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*Environ. Chem. 2006, 3, 26*

Miniaturization, portability and automation are three major issues in environmental chemistry research that can be fully accomplished by exploitation of flow-injection based approaches. Actually, the fast response of flow injection makes the analytical data available in real-time, which is especially desirable for environmental monitoring. Although initially devised for liquid-phase assays, flow systems have also proven suitable for automated handling of solid samples, which opens new avenues for the performance of fractionation analysis (e.g. sequential extraction methods) in an automated dynamic fashion.

#### **Coupling between the Tropospheric Photochemistry of Nitrous Acid (HONO) and Nitric Acid (HNO<sub>3</sub>)**

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*Environ. Chem. 2006, 3, 31*

Nitrous acid (HONO) is formed in the troposphere in urban, rural and remote environments via several uncertain heterogeneous and photochemical processes that involve nitric acid (HNO<sub>3</sub>). A recently recognised process is initiated by the deposition and migration of HNO<sub>3</sub> within snow-pack surfaces to form nitrate anions (NO<sub>3</sub><sup>-</sup>). Photo-reduction of NO<sub>3</sub><sup>-</sup> followed by acidification of the nitrite (NO<sub>2</sub><sup>-</sup>) photo-product leads to emissions of gas-phase HONO. Seasonal observations at Halley, Antarctica are consistent with the formation of HONO via this process, which is potentially of global significance because much of the Earth's land (and sea) surface is covered with snow and is sunlit for much of the year. Both HONO and HNO<sub>3</sub> significantly influence the production of ozone (O<sub>3</sub>), which acts as a greenhouse gas in the troposphere, via their respective roles as a source of hydroxyl radicals (OH<sup>\*</sup>) and as a sink for OH<sup>\*</sup> and nitrogen dioxide (NO<sub>2</sub>).

#### **Removal of Iodinated X-Ray Contrast Media During Drinking Water Treatment**

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*Environ. Chem. 2006, 3, 35*

In recent years, many micro-organic pollutants, e.g. pharmaceuticals and personal care products (PPCP), have been observed to be persisting through wastewater treatment and occurring in the environment. Persistent micropollutants are of particular concern owing to the fact that some of them have been found in drinking water, and iodinated X-ray contrast media (ICM) are one group of such pollutants.

#### **Kinetic Model for the Degradation of MTBE by Fenton's Oxidation**

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*Environ. Chem. 2006, 3, 40*

Since the early 1990s, methyl *tert*-butyl ether (MTBE), a possible human carcinogen, has been used as a gasoline oxygenate at concentrations of up to 15% by volume; however, a fraction of the MTBE produced has inevitably been released to the environment. And, spills at gasoline service stations have resulted in local groundwater contamination levels of MTBE over 100 mg L<sup>-1</sup>, because of its very high water solubility. Advanced oxidation is a common technique for mineralizing organic contaminants, but the reaction chemistry needs to be better understood to facilitate design of remediation systems.

#### **Copper Partitioning Among Mineral and Organic Fractions in Biosolids**

*I. W. Oliver, G. Merrington, M. J. McLaughlin*

*Environ. Chem. 2006, 3, 48*

Only a portion of the total amount of heavy metals present in sewage biosolids is accessible to organisms, including plants, and therefore only that portion presents any possible toxicity threat. However, metals such as copper, which are commonly associated to a large degree with the organic fraction, may become more accessible over time as organic components degrade. Determining the extent of partitioning of Cu between the organic and inorganic fractions may provide an indication of any long-term risks associated with utilisation of biosolids in agriculture.

**Sorption of the Herbicide Terbumeton and its Metabolites onto Soils. Influence of Copper(II)***D. Abiven, S. Boudesocque, E. Guillon, M. Couderchet, J. Dumonceau, M. Aplincourt**Environ. Chem. 2006, 3, 53*

Agrochemicals have contributed greatly to modern agriculture, allowing better yields and lower costs. However, their extensive use has led to frequent contamination of underground and surface water. A better knowledge of the fate of pesticides from the sprayer to the water that would take into account the diversity of the physical and chemical properties of the various molecules and environmental conditions should help in the challenge of protecting and restoring natural water quality.

**Prediction of Zinc and Cadmium Phytoavailability Within a Contaminated Agricultural Site using DGT***J.-Y. Cornu, L. Denaix**Environ. Chem. 2006, 3, 61*

In some agricultural areas, soils are contaminated by trace elements. This contamination of cultivated soils may constitute a serious problem for human health through the accumulation of metals in the edible parts of crops. In order to assess the risk for human health associated with metal contamination of soil, we need to develop simple tools like Diffusive Gradients in Thin Films (DGT) for predicting crop metal accumulation. The present study focuses on an agricultural site contaminated with fallout from industrial dust and reveals that DGT could be a predictive tool of zinc accumulation in lettuce.

**Phosphate Removal from Aqueous Solutions using Neutralised Bauxite Refinery Residues (Bauxsol™)***D. J. Akhurst, G. B. Jones, M. Clark, D. McConchie**Environ. Chem. 2006, 3, 65*

Eutrophication of freshwater and marine ecosystems is a global problem, which is frequently linked to high phosphorus concentrations. The present study investigated the use of Bauxsol™, a modified bauxite refinery residue, to remove dissolved phosphate from water, and has shown that it can be used as a cost-effective adsorbent for treating phosphate-contaminated waters. The results provide water and environmental managers with a new technique for decreasing the phosphate loads in water and wastewater. Environmental benefits include improved water quality, minimisation of excessive plant growth, including potentially toxic blue green algae, and the utilisation of an industrial residue for environmental remediation.