

## Contents in Context

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#### **Marine Biogeochemistry of Iron**

*S. J. Ussher, E. P. Achterberg, P. J. Worsfold*

*Environ. Chem. 2004, 1, 67*

Several trace elements are essential to the growth of microorganisms, iron being arguably the most important. Marine microorganisms, which affect the global carbon cycle and consequently indirectly influence the world's climate, are therefore sensitive to the presence of iron. This link means iron-related oceanic processes are a significant ecological and political issue.

#### **Brominated Flame Retardants in the Environment—The Price for our Convenience?**

*J. de Boer*

*Environ. Chem. 2004, 1, 81*

Flame retardants have been employed for centuries to reduce the flammability of materials; in our age, furniture, textiles, and electronic equipment are heavy users of effective and inexpensive brominated flame retardants. Evidence links these materials to endocrine disruption and bioaccumulation, but better detection and quantification of this large (75 member) molecular family, in order to explore the fine details of this toxic link, is both lacking and of pressing need.

#### **Rhizotron Study of Cucurbitaceae: Transport of Soil-Bound Chlordane and Heavy Metal Contaminants Differs with Genera**

*M. J. I. Mattina, W. Iannucci-Berger, B. D. Eitzer, J. C. White*

*Environ. Chem. 2004, 1, 86*

Many pesticides are difficult to remove from the soil, and remain as persistent pollutants. Some plant species can extract these pollutants from the soil and thereby degrade them, leading to a potential plant-based soil remediation technology. This study examines how plants extract an enduring organic pollutant (chlordane) and heavy metals (zinc, cadmium) from the soil, where they are processed in the plant, and what end-products are generated.

#### **First Characterization and Dating of East Antarctic Bedrock Inclusions from Subglacial Lake Vostok Accreted Ice**

*B. Delmonte, J. R. Petit, I. Basile-Doelsch, V. Lipenkov, V. Maggi*

*Environ. Chem. 2004, 1, 90*

Lake Vostok is a large subglacial lake trapped below the East Antarctic ice sheet. The meteoric ice from deep Vostok ice cores has been used to document the climatic history of the Earth over hundreds of millennia, while the deeper part of the core preserves some basal rock fragments. These rock fragments represent unique geological samples of the inhospitable, ice-covered East Antarctic Plateau.

#### **Measurement of Denitrification in the Changjiang River**

*W. Yan, A. E. Laursen, F. Wang, P. Sun, S. P. Seitzinger*

*Environ. Chem. 2004, 1, 95*

Rivers are carrying an increased load of nitrogen-based matter (nitrates, nitrites) resulting from, among others, increased use of agricultural fertilizers. This nitrogen enrichment leads to a proliferation of plant life in the receiving water body, which in turn reduces the dissolved oxygen content and can cause the extinction of other organisms. Rivers can reduce their nitrogen levels through denitrification, the bacterially mediated transformation of dissolved nitrates and nitrites to gaseous N<sub>2</sub> and N<sub>2</sub>O. This paper reports the first examination of denitrification in China's largest river, the Changjiang (Yangtze) River, to understand the details of riverine denitrification and its role on controlling nitrogen export.

#### **The Use of the 'Ammonium Diffusion' Method for $\delta^{15}\text{N-NH}_4^+$ and $\delta^{15}\text{N-NO}_3^-$ Measurements: Comparison with Other Techniques**

*M. Sebiló, B. Mayer, M. Grably, D. Billiou, A. Mariotti*

*Environ. Chem. 2004, 1, 99*

Nitrogen is an essential element for all living organisms, and its biogeochemical cycle is connected to the cycling of carbon, sulfur, phosphorous, oxygen, and trace metals. Measurement of the isotopic composition of ammonium (NH<sub>4</sub><sup>+</sup>) and nitrate (NO<sub>3</sub><sup>-</sup>) containing samples provides a better understanding of the nitrogen cycle. While the established 'ammonium diffusion' measurement has many advantages, it is not easy for inexperienced people to prepare samples. This paper shows how the method can be simplified, ideally for samples freshly collected from the field.

#### **Novel Determination of Elemental Carbon in Sediments by DRIFTS**

*J. W. T. Tung, I. S. C. Lee, P. A. Tanner*

*Environ. Chem. 2004, 1, 104*

Elemental carbon in anthropogenic pollutants has been linked in a general way to adverse health effects. Carbon may be present in many forms, including charcoal, graphite, organic (such as fuel- and biomass-derived), and inorganic. However, the boundaries between the various forms of carbon are not clearly delineated, which impedes more precise carbon-health linkage. This paper points towards a straightforward, general method for quantifying elemental carbon in environmental samples.

**Photodegradation of Iron(III)-EDTA: Iron Speciation and Domino Effects on Cobalt Availability**

*R. G. W. Laan, T. Verburg, H. Th. Wolterbeek, J. J. M. de Goeij Environ. Chem. 2004, 1, 107*

Aquatic life requires access to sufficient nutrients and trace metals in the surrounding waters. Measuring the speciation (in solution or precipitated, free ionic or complexed) of trace metals is a traditional procedure to assess the potential of waters for life. Iron, an important nutrient, is relatively insoluble, and iron–ligand complexes are required to keep the iron in solution and bioavailable. Sunlight often degrades these iron–ligand complexes, and the subsequently released iron can outcompete other (trace) metals for *their* ligands. A ‘domino’ effect on weaker metal–ligand complexes will occur which complicates the actual dynamic speciation and its measurements.

**Australian Biosolids: Characterization and Determination of Available Copper**

*I. W. Oliver, G. Merrington, M. J. McLaughlin Environ. Chem. 2004, 1, 116*

Land application of sewage-derived biosolids is both an inexpensive method to dispose of waste and a simple way to increase soil fertility and stability. However, biosolids often contain high concentrations of heavy metals, but not all of the metals are immediately available for uptake by the soil or other organisms. To determine if this toxicologic risk outweighs the benefits, the degree of ecologically available metal, rather than simply the entire metal content, must be known in both the as-disposed and worst conditions scenarios. Application of these principles requires regulatory bodies to amend their guidelines.