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Contents in Context
Environmental Chemistry, Vol. 7(1), 2010

Aggregation of titanium dioxide nanoparticles: role of calcium and phosphate
Rute F. Domingos, Caroline Peyrot and Kevin J. Wilkinson *Environ. Chem.* **2010**, *7*, 61

The increasing use of nanomaterials in consumer products has led to increased concerns about their potential environmental and health impacts. TiO_2 is a widely used nanoparticle found in sunscreens and electronic products. In order to understand and predict the mobility of TiO_2 in the natural environment, it is essential to determine its state of aggregation under environmentally relevant conditions of pH, ionic strength, ion and natural organic matter content. Aggregation is likely to lead to both reduced mobility and bioavailability in soils and natural waters.

Measurements of nanoparticle number concentrations and size distributions in contrasting aquatic environments using nanoparticle tracking analysis
Julián A. Gallego-Urrea, Jani Tuoriniemi, Tobias Pallander and Martin Hassellöv *Environ. Chem.* **2010**, *7*, 67

Manufactured and unintentionally produced nanoparticles have been of environmental concern owing to potential harm to humans and ecosystems, but very little is known of the actual concentrations of these owing to limitations of available methods. In order to understand both the potential adverse effects and the underlying natural processes, improved measurement techniques are needed. Here, we explore the feasibility of a novel minimum perturbation method that relates the diffusive movement of nanoparticles in a light field to their size distributions.

Using FlFFF and aTEM to determine trace metal–nanoparticle associations in riverbed sediment
K. L. Plathe, F. von der Kammer, M. Hassellöv, J. Moore, M. Murayama, T. Hofmann and M. F. Hochella Jr. *Environ. Chem.* **2010**, *7*, 82

Determining associations between trace metals and nanoparticles in contaminated systems is important in order to make decisions regarding remediation. This study analysed contaminated sediment from the Clark Fork River Superfund Site and discovered that in the $<$1-μm fraction the trace metals were almost exclusively associated with nanoparticulate Fe and Ti oxides. This information is relevant because nanoparticles are often more reactive and show altered properties compared with their bulk equivalents, therefore affecting metal toxicity and bioavailability.

Roles of dissolved organic matter in the speciation of mercury and methylmercury in a contaminated ecosystem in Oak Ridge, Tennessee
Wenming Dong, Liyuan Liang, Scott Brooks, George Southworth and Baohua Gu *Environ. Chem.* **2010**, *7*, 94

Mercury (Hg) presents an environmental concern owing to its transformation to the potent neurotoxin methylmercury (CH_3Hg^+). The environmental factors that control bacterial methylation of mercury are poorly understood, but we know that methylmercury is bioaccumulated and biomagnified in aquatic food webs. We show that, even at low concentrations ($\sim$3 mg L^{-1}), natural dissolved organic matter strongly complexes with ionic Hg^{2+} and CH_3Hg^+, thereby influencing biological uptake, and methylation of Hg in aquatic environments.

Effect of ash from forest fires on phosphorus availability, transport, chemical forms, and content in volcanic soils
Mauricio Escudey, Pamela de la Fuente, Mónica Antilén and Mauricio Molina *Environ. Chem.* **2010**, *7*, 103

Intensive fertilisation and the availability of phosphorus species (less than 10%) in cultivable soils of volcanic origin are causing the accumulation of P in these soils. Phosphorus is a macronutrient that severely limits good agricultural development, so knowledge of the distribution and the different forms of P present in soils is fundamental for sustainable agricultural practice. This novel study reports the existence of increased available P in all the soils that received a load of plant ash from different tree species.

Phase II pharmaceutical metabolites acetaminophen glucuronide and acetaminophen sulfate in wastewater
Manjula Sunkara and Martha J. M. Wells *Environ. Chem.* **2010**, *7*, 111

Excretion of pharmaceuticals and their metabolites by humans and animals, flushing unused pharmaceuticals and inadequate water treatment result in the occurrence of these chemicals as pollutants in wastewater, surface water and drinking water. In this research, the pharmaceutical agent acetaminophen (paracetamol, Tylenol) and its glucuronide and sulfate metabolites were examined as a model system for monitoring wastewater influent and effluent. The true risk to ecosystems and humans from the occurrence of pharmaceuticals in our water supply can only be estimated if accurate concentrations of parent pharmaceutical chemicals as well as their metabolites are measured.

In-situ sampling of soil pore water: evaluation of linear-type microdialysis probes and suction cups at varied moisture contents
Manuel Miró, Walter J. Fitz, Siegfried Swoboda and Walter W. Wenzel *Environ. Chem.* **2010**, *7*, 123

There is a need for slightly invasive techniques capable of in-situ probing of target analytes in environmental compartments. Owing to its passive sampling mode and small probe dimensions, microdialysis-based dosimetry is an appealing tool for monitoring of solute concentrations in both water bodies and pore soil waters with minimum disturbance of natural equilibrium. The development of field applications is challenging but will provide novel insights as to the speciation and bioaccessibility of environmental pollutants, e.g. trace metals, at high spatial resolution.