Biophysico-Chemical Processes Involving Natural Nonliving Organic Matter in Environmental Systems

Little is known about the fundamentals of physico-chemical and biological interfacial reactions and their impact on nonliving natural organic matter (NOM) in nature. To advance the frontiers of knowledge on the subject matter would require a concerted effort of scientists in relevant physical and life sciences such as chemistry, mineralogy, geochemistry, microbiology, ecology, and soil, atmospheric, and aquatic sciences. Environmental science is indeed the fusion of physical and life sciences. Scientific progress in advancing the understanding of NOM in the environment is based ultimately on unification rather than fragmentation of knowledge.

The overall goal of this project is to provide the scientific and professional communities with an up-to-date and critical evaluation by world-leading scientists of the biophysico-chemical processes of NOM in various environmental compartments. The specific objectives are to address (1) the fundamentals and the impact of mineral-organic matter-biota interactions on the formation, nature and properties, transformation, turnover, and storage of NOM in various environmental systems, and (2) state-of-the-art analytical methods for investigating the biophysico-chemical processes involving NOM in nature.

New IUPAC-Sponsored Wiley Book Series
Biophysico-Chemical Processes in Environmental Systems
Series Editors: P.M. Huang and N. Senesi

The IUPAC Chemistry and the Environment Division recently approved the creation of an IUPAC-sponsored book series entitled Biophysico-Chemical Processes in Environmental Systems, which will be published by John Wiley & Sons, Hoboken, NJ. This series addresses the fundamentals of physical-chemical-biological interfacial interactions in the environment and the impacts on: (1) the transformation, transport, and fate of essential nutrients, inorganic and organic pollutants and pathogens, (2) food chain contamination and food quality and safety, and (3) ecosystem health including human health. With rapid developments in environmental physics, chemistry and biology, it is becoming much harder, if not impossible, for scientists to follow new developments outside their immediate area of research by reading the primary research literature. This book series will present a distilled and integrated version of new developments in biophysico-chemical processes in environmental systems.

Volume 1: Biophysico-Chemical Processes of Metals and Metalloids in Soil Environments (for details, see <www.iupac.org/projects/2004/2004-003-3-600.html>)

The outcomes of this project will be published as volume II of a recently approved book series to be published by Wiley (see box). The book will also identify gaps in knowledge on the subject matter, thereby providing future directions for research on biophysico-chemical interfacial reactions in natural habitats. This in turn may lead to the subsequent development of innovative management strategies to sustain environmental quality and ecosystem health on a global scale.

In contrast to classical books, which largely focus on separate physicochemical and biological aspects, this book aims to integrate the frontiers of knowledge on NOM in soil, sediment, water, and air.

The book will be co-edited by N. Senesi, B. Xing, and P.M. Huang.

For more information, contact Task Group Chairman Nicola Senesi <senesi@agr.uniba.it>.

www.iupac.org/projects/2006/2006-014-1-600.html

Trace Elements Analysis: Role of Grain Size Distribution in Solid Reference Materials

Existing guidelines do not report indications for the selection of the most appropriate particle size distribution for reference material. In the case of solid reference material, particle size distribution plays a vital role in the homogeneity of the material and in the minimum representative test portion required for performing trace element analysis. Commonly, matrix reference materials originating from different producers show different particle size distributions. In the case of soil and sediment, particle size distribution ranges from <120 μm to <20 μm.

Finer particles can increase the homogeneity of the material, but the reference material can significantly differ from the real samples routinely analyzed in the laboratories. In the case of contaminated soils, the analyses are usually carried out on test samples with particle sizes of <2 mm, while the related reference materials have particle sizes of <90 μm. The effect of particle size on extractable trace metals in soil reference materials already has been observed (A. Sahuquillo et al., "Certified Reference Materials for Extractable Trace Metals in Soils: Effect of the Particle Size," 1998, *Fresenius J. Anal. Chem.* 304–307). In addition, it is also necessary to point out that the production of reference materials with fine size particle