

**Seminarios de la Sociedad
Española de Mineralogía**

08

**XXXI Reunión de la Sociedad
Española de Mineralogía**

**Workshop on Nanoparticles in
the Environment**

Barcelona, 7 de Septiembre 2011

Editora:
Gabriela Roman-Ross



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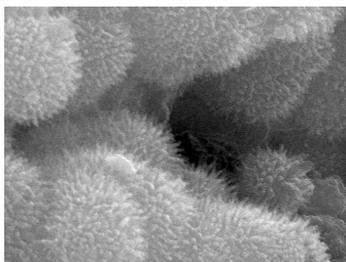
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Volumen 08

Nanoparticles in the Environment

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Amphos21 Consulting SL



Cover photo

Aggregates of nanoparticles of schwertmannite, $\text{Fe}_{16}\text{O}_{16}(\text{OH},\text{SO}_4)_{12-13}\cdot 10-12\text{H}_2\text{O}$, with the typical hedge-hot morphology precipitated from acid mine drainage (Field Emission Scanning Electron Microscopy image). Length of the diagonal of the photography = 4 μm .



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de Mineralogía**

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Foreword

The current world-wide interest in nanometer-sized particles has strongly promoted the study of the fate, stability and reactivity of nanominerals in the environment from the geosciences point of view. Nanoparticles are basically particles in the nanometer size-range (< 1mm) and many pathways operating under a broad diversity of conditions generate nanoparticles in the oceans, atmosphere, soil and subsurface. In the last years geoscientists have clearly highlighted that minerals and planetary materials can behave very differently at the nanoscale comparing with their bulk counterparts. Significant variations in structural, thermodynamic, mechanical, electrical, magnetic, optical, and kinetic properties have been observed when one or more dimensions of a mineral are reduced to the nanoscale. As a result, geological processes that involve nucleation and crystal growth, precipitation, dissolution, phase transformation, surface reactivity and mineral–microbe interactions are all related to nanoscale phenomena. The reactivity and stability of nanoparticles is important in determining the baseline behavior for aquatic systems, but their reactivity is also involved in natural attenuation processes and environmental remediation. On the other hand, the increasing use of engineered nanoparticles in industrial and household applications will very likely lead to the release of such materials into the environment. As a result nanoparticles are beginning to come under scrutiny and the discussion about the potential adverse effects has increased in recent years. In fact, it has become a top priority in governments, the private sector and the public all over the world.

The workshop tries to introduce the non-specialist to the main properties of nanoparticles, the methods of study characteristic of the nanoscale, their behavior in the aquatic and atmospheric systems, and their main affections to the health of humans and ecosystems. The workshop and this book have been possible thanks to the generous contributions of the authors. Our sincere acknowledgment for accepting our invitation; for the Spanish Mineralogical Society and for the Organizing Committee of the XXXI meeting it was a privilege to count on them. Different institutions have provided financial support to the organization of this Workshop and the preparation of this volume. We acknowledge the Spanish Ministry of Science and Innovation, the University of Barcelona, the Polytechnic University of Catalonia, the Institute of Earth Sciences Jaume Almera (CSIC), the Institute of Environmental Assessment and Water Research (CSIC), and Amphos21 Consulting S.L.

Comité Organizador de la XXXI Reunión de la SEM

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