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Effects of Fe oxide nanoparticle size and structure on reactivity and bioavailability

November 3rd at 12:00 at *Sala de Graus Eduard Fontseré* (Faculty of Physics-Universitat de Barcelona)

By Prof. Patricia Maurice from Dept. of Civil & Environmental Engineering & Earth Sciences, University of Notre Dame (USA)

*Natural Fe oxide nanoparticles are widely distributed in the environment. They can play important roles in contaminant transport and they serve as a key source of Fe to ocean algae. The nanomineral ferrihydrite forms the core of the Fe storage protein ferritin, which is present in humans. The extent of contaminant metal sorption to the mineral hematite (α -Fe₂O₃) can be affected by nanoparticle size. Hematite nanoparticles smaller than ~10 nm also tend to dissolve more rapidly and they are more bioavailable as a source of Fe to aerobic bacteria. Ferrihydrite, which occurs in more ordered 6-line and less ordered 2-line structures, is bioavailable to aerobic bacteria. The 2-line variety dissolves more rapidly and thus supports bacterial growth more readily than the 6-line form. Observation that ferrihydrite-associated Fe is highly bioavailable to pathogenic *P. aeruginosa*, whether or not the nanomineral is coated by ferritin protein, has important implications for treatment of cystic fibrosis patients. Interdisciplinary research on Fe oxide nanoparticle structure, properties, and reactivity is important not only for industrial purposes but also to obtain a better understanding of environmental and biomedical processes.*



Prof. Patricia Maurice is from the Dept. of Civil & Environmental Engineering & Earth Sciences at the University of Notre Dame (USA). Her research focuses on interactions between minerals (including nanoparticles), metals, organic matter and bacteria. She received the Ph.D. in Aqueous and Surface Geochemistry from Stanford University. Her Research on organic interactions with Fe Oxides represented the first Ph.D. dissertation to apply atomic force microscopy in geoscience and environment engineering. Patricia has served as Associate Dean for Research in Engineering. She authored the interdisciplinary textbook, “Environmental Surfaces and Interfaces from the Nanoscale to the Global Scale.”

For further details on this lecture, please, contact Dr. Xavier Batlle at xavierbatlle@ub.edu