

Adsorption of Environmentally and Biologically Relevant Molecules on Nanoparticles Surfaces: Impact on Nanoparticle Contaminant Behavior

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Introduction

The adsorption of environmentally and biologically relevant molecules on the surface of metal oxide nanoparticles can impact the properties of these small particles and thus their contaminant behavior. In particular, the impact of surface adsorption on the properties (dissolution, aggregation and reaction chemistry) of nanoparticles in aqueous suspensions will be presented. Additionally, the role of size, particularly for nanoparticles below 10 nm in diameter, will be discussed.

Approach

The approach in these studies is to combine microscopy, spectroscopy, light scattering measurements, surface probes of adsorption and chemistry, along with health effects, to better understand the behavior of oxide nanomaterials in the presence of environmentally and biologically relevant ligands.

Discussion of Results

This talk will focus will be on recent studies and results on the oxide nanoparticles including naturally occurring iron oxides [1–4]. The differences between nanoparticles, especially those below 10 nm, and larger sized particles will be highlighted as well.

- [1] Mudunkotuwa *et al* (2014) *Analyst* **139**, 870-881
[2] Borchering *et al* (2014) *Environ. Sci.:Nano*, DOI:10.1039/C3EN00029J [3] Wijenayaka *et al* (2012) *J Phys Chem C*, **116**, 12566-12577 [4] Rubasinghege *et al* (2010) *Proc. Natl. Acad. Sci*, **107**, 6628-6633