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Kinetics of metal-arsenate precipitate formation at the goethite-water interface

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The effects of metals on the sorption process of As (V) and vice versa in common metal-oxy-hydroxide suspensions are not well understood. The short and long-term sorption kinetics of 0.25mM Zn (II) and As (V) were investigated in pH 7 suspensions of 10, 100, and 1000 mg goethite L⁻¹ (ppm). Sorption in the 1000ppm suspensions was rapid with Zn (II) sorption increasing by ca. 30% over its control, while no additional As (V) sorption occurred. In 10 and 100ppm suspensions, an initial rapid sorption reaction of Zn (II) and As (V) was followed by an interim period of no additional uptake before both Zn (II) and As (V) sorption increased by ca. 30%, respectively, increasing slowly thereafter beyond 500hrs. Initial EXAFS experiments of the 1000ppm goethite suspension system showed with increasing reaction time that the second shell of As (V) increasingly conformed to Zn over Fe.

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