# EFFECT OF MINERAL SYSTEMS ON LEAD REMOVAL FROM AQUEOUS SOLUTION PART I

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## ABSTRACT

Mineral systems have been investigated to determine their effect on lead removal. These mineral systems comprises kaolinite, montmorillonite, goethite and their mixtures. This study was in relation to reactivity and kinetics relevant to streams and groundwater impacted by lead. The batch mode study was conducted at room temperature (23 ± 2 ◦C). Reactivity studies demonstrate enhancement of proton coefficient and the acidity of reactive sites by mixed mineral systems except for kaolinite-montmorillonite, thus increasing lead removal by proton exchange. Kinetic studies demonstrate two- phase reactions with minimal intra-particle diffusion attributed to outer sphere complexation and inner sphere complexation. In the first-phase reaction, mineral mixing decreased the mass transfer rates for kaolinite-montmorillonite and montmorillonite-goethite, not affecting kaolinite-goethite. For the second-phase reaction, mineral mixing did not change the mass transfer rates for the mixed mineral systems except for montmorillonite-goethite. The behaviors of the mixed mineral systems suggest that different reactive sites were involved at the onset of sorption, with reactions and sorption ending with inner-sphere complexation.

**Keywords:** Particle size, lead, removal, kinetics, mixed mineral systems.