Energetics of Arsenic (V) Sorption on Amorphous Aluminum Hydroxides Determined by Flow Calorimetry. (S02-kabengi163017-Poster)

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Abstract:

The mechanisms whereby arsenate interacts with the surface of amorphous aluminum hydroxides (AHO) have been investigated using flow calorimetry along with other chemical and physical measurements. As (V) sorption by AHO has been found to be strongly exothermic with heats of sorption ranging from 63 to 66 KJ/mole while the heats of Cl/NO3 exchange determined on the same AHO samples were in the range of 4 to 5 KJ/mole. No cation exchange was observed after As (V) sorption suggesting that a negative surface charge does not result from arsenate sorption. A pH increase indicated that arsenate replaced surface hydroxyl groups. Furthermore, it is clear from the peak shapes that As (V) sorption and Cl/NO3 exchange occurred at different rates. Our results suggest that the reaction of arsenate with AHO is not strictly a ligand exchange reaction at the surface but includes a second slower reaction. Future calorimetric and physical measurements will resolve the nature of the second reaction (precipitation, diffusion or both) and further complete a comprehensive model of the interaction of As (V) with AHO.

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Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 9:00-11:00 am
Poster Board Number: 1323

Keywords:

Arsenate , Heats of sorption , Flow calorimetry, amorphous aluminum oxides