The Effect of Residence Time on Arsenate Sorption/Desorption Processes on Mineral Surfaces

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In order to make sound decisions regarding arsenate contamination, it is necessary to understand the mechanisms of arsenate sorption/desorption over extended time periods and as affected by common soil nutrients. Accordingly, the major objectives of this study are to determine the effect of residence time on the mechanisms of As sorption/desorption on goethite and gibbsite, and to determine the effects of phosphate and sulfate, on the release of sorbed As. Spectroscopic studies using X-ray absorption spectroscopy (EXAFS) and kinetic studies will be employed to provide some much needed information on the fate of As in the environment over long time periods. Preliminary studies have shown that total arsenate sorption on goethite increased with time. Sorption was initially rapid with over 93% being sorbed in a 24 h period. When residence time was increased from one to two weeks, there was no significant change in the amount of arsenate desorbed from goethite by phosphate. The total amount of As desorbed increased with increased desorption equilibrium time.