Characteristics of Arsenite Adsorption-desorption on Layered Double Hydroxides. (S02-you105637-Poster)

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Abstract:

Arsenic (As) is a toxic trace element to animals and humans. In 2001, EPA passed new regulations that significantly lowered legal As levels in drinking water. Reduction of As from drinking waters, therefore, requires additional research on developing new adsorptive materials for As removal. The objective of this study was to identify the adsorption of As(III) on uncalcined and calcined magnesium-aluminum layered double hydroxides (LDHs). Results indicated that As(III) could be adsorbed on LDH-Cl and calcined-LDH, with adsorption isotherms being typical L and H-type curves, respectively. Kinetic studies on As(III) adsorption by calcined-LDH suggested the retention process was slow. Adsorption of As(III) by LDH-Cl did not vary with solution pH, but As(III) adsorption by calcined-LDH was a function of pH. Competing anions strongly affected As(III) adsorption by calcined-LDH, with increasing As (III) adsorption following the order: $HPO_4^{2-} < SO_4^{2-} < CO_3^{2-} < F^- < Cl^- < Br^- = I^- < NO_3^-$. Calcined-LDH could be recycled and reused as an adsorbent for As(III), but its adsorption efficiency dropped with successive recycling steps. Results indicated LDHs could be useful as environmental adsorbents for removing aqueous As(III) in contaminated ecosystems.

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