Coagulation of arsenic adsorbed ferrihydrite with the use of polyaluminium chloride (PAC) or polyferric sulfate (PFS)

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\textbf{ABSTRACT}

Ferrihydrite is effective in arsenic removal because of the considerable amount of active hydroxyl groups. Solid–liquid separation of the arsenic adsorbed ferrihydrite from aqueous solution is important for the arsenic treatment technology. Coagulation is a promising process for ferrihydrite separation. Effects of different coagulants on arsenic adsorbed ferrihydrite settlement were investigated. Surface charge significantly decreased after arsenic was adsorbed on ferrihydrite. Turbidity, iron and arsenic removal efficiencies were used to characterize the ferrihydrite settling process. Turbidity removal efficiency with polyferric sulfate (PFS) added was 98.2\% when pH was 5.0. Meanwhile, the turbidity removal rate with polyaluminium chloride (PAC) added was 96.3–97.3\% when the pH of colloidal suspensions was 7.0–9.0. Arsenic or iron removal rate after 30 min settling was improved from about 40 to 80\% with coagulants added. The mean size of flocs after coagulation process was 61.8 \mu m after PFS was added, or 71.6 \mu m after PAC was added when the pH was 6.5. The floc structure of ferrihydrite became more compact and stable with PAC or PFS added.

\textit{Keywords:} Coagulation; Ferrihydrite; Arsenic adsorbed

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