Impact of Fe/Zn Ratios and Alkaline Reactants on the Zn Species Formed During Precipitation of Ferrihydrite. (S02-beauchemin104703-Poster)

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Abstract:

In the mining industry, the lime treatment of acidic effluents generates each year large volumes of sludges that contain an important amorphous Fe phase. The long-term stability of metals in the sludge is unknown. Zn is often of concern because of its relatively high concentration. The objective of this study is to understand Zn(II) species formed during precipitation of ferrihydrite at various Fe to Zn molar ratios, using three different alkaline reactants. Fe solutions were enriched with Zn to achieve Fe/Zn molar ratios of 100, 10, and 1. The Fe/Zn solutions were then precipitated using potassium or calcium hydroxide, or calcium hydroxide enriched with calcium carbonate. The precipitates were analyzed using XAS spectroscopy. Depending on the Fe/Zn ratio, unique species of Zn(II) were formed during the precipitation of ferrihydrite. Calcium and potassium hydroxide gave similar results at ratios of Fe/Zn 100 and 10. At a Fe/Zn ratio of 10, the results suggest that a greater proportion of Zn (II) would occur as adsorbed species. In contrast, Zn would mainly be integrated within the ferrihydrite structure at a Fe/Zn ratio of 100. The knowledge of Zn speciation can provide insight on how changes in the sludge chemistry would affect the Zn mobility in the environment.

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