

# Predicting Nickel Precipitate Formation in Contaminated Soils. (3717)

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## Abstract:

The formation of secondary metal precipitate phases in contaminated soils plays a crucial role in determining the long term fate of toxic metal pollutants. In particular, the formation of mixed metal-Al hydroxide phases using substrate derived Al may substantially reduce the mobility and bioavailability of Ni, Co and Zn. However, a better understanding of the factors controlling precipitate formation is still needed. In this study, we have combined experimental data on nickel speciation in laboratory contaminated soils with thermodynamic and kinetic analyses of precipitate stability. Macroscopic and molecular scale results indicate that the formation of mixed Ni-Al hydroxide phases in soils is primarily dependent on soil pH and aluminum solubility from the clay substrate. The presence of higher concentrations of organic matter can significantly retard the rate of precipitate formation, although these effects are less noticeable as the pH increases. Ni desorption from the soils decreased as the soils aged, consistent with thermodynamic predictions that changes in the interlayer anions of these mixed metal-aluminum hydroxides will result in increased precipitate stability over time. A predictive model for determining which soils could support precipitate formation is currently under development based on these results.

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