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Kinetics of nickel precipitate formation in soils

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The formation of mixed metal-Al hydroxide precipitates can be an important mechanism for retention and sequestration of nickel in contaminated soils. As these precipitates age, their stability increases, resulting in decreased metal release to solution. Thus, these phases may play an important role in reducing metal mobility and bioavailability in natural systems. In this work, macroscopic and molecular scale techniques have been combined to determine the kinetics and controlling factors of nickel hydroxide precipitates in heterogeneous soils. Kinetic studies of Ni sorption and desorption were carried out over pH ranges from 6-7.5 and x-ray absorption spectroscopy used to determine the extent and nature of nickel precipitate formation. Precipitate formation began after as little as 4 hours in some soils, but was hindered by low pH and soil organic matter concentrations above 5 percent. Desorption studies show decreased nickel solubility as a result of precipitate formation.

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