

Nickel Sorption Mechanisms in a Mixed Pyrophyllite-Montmorillonite System

E. J. Elzinga

Surface precipitation and adsorption are thought to be consecutive metal uptake mechanisms, with adsorption being the mechanism responsible for the initial stage of Ni sorption, and surface precipitation being the slower process controlling the later stage of Ni uptake on mineral surfaces. Extended X-ray absorption fine structure (EXAFS) data on sorption studies on Ni/clay systems revealed that the Ni sorption behavior for a Ni/montmorillonite system during the first 40 minutes differed from the Ni sorption behavior of a Ni/pyrophyllite system: the Ni/montmorillonite system was still in the initial stage of Ni uptake while the Ni/pyrophyllite system had entered the stage of surface precipitate formation. Therefore, surface precipitation and adsorption are competing rather than consecutive mechanisms for Ni uptake in pyrophyllite/montmorillonite mixtures. EXAFS data on Ni sorption in mixtures of pyrophyllite and montmorillonite are presented. The Ni sorption behavior in the mixed systems, and a method to estimate the Ni distribution over the mixture components will be presented.