

069. MONITORING THE GROWTH OF SECONDARY PRECIPITATES UPON METAL SORPTION ON CLAY MINERALS AND ALUMINUM OXIDES USING X-RAY ABSORPTION FINE STRUCTURE (XAFS)

SPECTROSCOPY

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Metal sorption on clay and oxide minerals is typically fast initially, then the rates gradually diminish. In the literature the decline in reaction rate has been attributed to metal sorption onto sites of lower reactivity, diffusion of the adsorbate into the adsorbent or by a precipitation reaction. We investigated the effect of reaction time on the surface coordination environment of Ni sorbed onto clays and aluminum oxides using X-ray adsorption fine structure (XAFS) spectroscopy. The kinetics was studied over a long reaction period (minutes to months) and changes in the XAFS spectra were monitored. As reaction time progressed, multinuclear Ni complexes increasing in size were depicted. Data analysis suggest the formation of mixed Ni/Al hydroxide phases kinetically controlled by the release of Al from the clay and aluminum oxide surface. This finding illustrates the importance of considering secondary precipitate formation when metals sorb on surfaces of clay minerals and aluminum oxides.