Investigation of Ni Adsorption on Pyrophyllite: An XAFS Study. A.M. SCHEIDEGGER*, D.L. SPARKS, Univ. of Delaware, and G.M. LAMBLE, Brookhaven National Laboratory.

X-ray absorption fine structure (XAFS) spectroscopy was used to discern the local atomic structure of Ni(II) sorbed onto pyrophyllite. The first coordination shell consists of 6 O atoms at 2.02-2.04 Å. For the second shell, XAFS data suggest a single Ni-Al/Si distance (2.96-3.03 Å), indicative of edge sharing of Ni and Al octahedra and possibly the presence of mixed Ni-Al hydroxides. As Ni surface loading on pyrophyllite increased, the number of Ni second-neighbor atoms at a distance of 2.99-3.00 Å increased from $N \approx 1$ to $N \approx 5$. The presence of multinuclear surface complexes was depicted at low surface loading and at reaction conditions undersaturated with respect to the formation of $Ni(OH)_2(s)$. This observation suggests that the total coverage of surface sites is not necessary for the formation of multinuclear surface complexes and implies that the pyrophyllite surface promotes hydrolysis and multinuclear complex formation.

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