
Hectorite Complexes with Cu(II) and Fe(II)-1,10-Phenanthroline Chelates*

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Abstract: Characteristics and properties of complexes of a smectite (hectorite) with 1,10-phenanthroline (phen) chelates with iron or copper were determined by a variety of physical and chemical measurements. The complex ions showed high selectivity for the hectorite surface. Basal spacings of 17.4 Å were produced by Fe(II) or Cu(II) analogues of $M(\text{phen})_3^{2+}$ hectorite. Adsorption of gases and vapors by the $M(\text{phen})_3^{2+}$ hectorite complex revealed large surface areas and reflected intrinsic characteristics of the complex ions. Lower surface areas were found for copper phen hectorite than iron phen hectorite probably because of the loss of a ligand from the Cu(II) ion. ESR spectra confirmed that appreciable Cu(II) existed as the *bis*-phen complex under certain conditions. An increase in the oxidation potential of the $\text{Fe}(\text{phen})_3^{2+} - \text{Fe}(\text{phen})_3^{3+}$ couple above that in pure solvent was noted when these complexes were supported by the mineral surface.

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