
The Effect of Dissolved Ligands upon the Sorption of Cu(II) by Ca-Montmorillonite

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Abstract: The effect of three organic ligands on the adsorption of Cu on Ca-montmorillonite was studied. The results indicate that these effects include three different processes: Enhanced uptake of positively charged Cu-ligand complexes by ion-exchange. Formation of ternary surface complexes involving surface aluminol groups. Inhibited uptake due to competition between the surface ligands and the dissolved ligands for dissolved copper. Ethylenediamine promotes Cu uptake by ion-exchange at low pH but tends to suppress adsorption at aluminol groups by ligand competition at high pH. The same mechanisms are operative for β -alanine; however, the uptake of $\text{Cu}(\beta\text{-ala})^+$ by ion-exchange is not promoted by the attached ligand. The influence of malonate includes both ligand competition and formation of ternary complexes. A quantitative interpretation based on the surface complexation model using the least-square programs FITEQL (Westall, 1982) and GRFIT (Ludwig, 1992) is presented. The obtained equilibrium constants are listed in Tables 2b and 3.

Key Words: Adsorption • β -alanine • Copper • Ethylenediamine • Malonic acid • Modeling • Montmorillonite

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