D-Glucosamine Sorption on Cu(II)-Montmorillonite as the Protonated and Neutral Species

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Abstract: The adsorption of D-glucosamine (2-amino-2-deoxy-D-glucose) in the protonated or neutral form on homoionic Cu^{2+}-bentonite was investigated by infrared (IR) and electron spin resonance (ESR) spectroscopy and chemical analyses of solution. The results show that the interaction of the glucosamine hydrochloride with the clay complexed a small fraction of interlayer metal ions with neutral amino sugar molecules. In contrast, the adsorption of free glucosamine was much more favorable and resulted in interlayer copper(II) complexes, mainly those in which the ligand was coordinated through amino and deprotonated hydroxyl groups. Part of the amino sugar molecules, however, were transformed into glucosammonium, replacing copper as the saturating ion.

Key Words: Adsorption • Copper • D-glucosamine • Electron spin resonance • Infrared spectroscopy • Montmorillonite • Protonation

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