Bonding of Polyacrylamides to Smectite, Illite and Kaolinite and their Effects on the Surface Properties of the Clays. (S06-deng132503-Oral)

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Abstract:

Polyacrylamides (PAMs) are used for erosion control, soil conditioning, water treatment, and oil recovery. We investigated the properties and behavior of PAM-clay complexes. Cationic PAM 494C had a higher affinity for clay surfaces than nonionic and anionic PAMs due to the strong electrostatic attraction. Yet the cations had a lower maximum adsorption, attributed to stronger flocculation effects. The nonionic and cationic PAMs intercalated smectite. Desorption of PAMs was negligible. PAM-clay complexes were hydrophilic and did not adsorb chlorophenols. Stretching vibrations of NH2 groups of PAM on smectite shifted to higher frequencies whereas the C=O band changed little. The NH2 and C=O stretching bands of Cu2+-saturated PAM 903N-smectite located at lower frequencies compared with Na+ or K+ saturated complexes. Ion dipole interaction/coordination occur between the amide group with the exchangeable cations. Hydrogen bonding may occur between the C=O group and water in the hydration shells of exchangeable cations. It is likely that the polymers are sorbed by kaolinite through H-bonding between the C=O groups of PAM with the OH surface of the mineral.

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Presentation Information:

Presentation Date: Monday, November 11, 2002
Presentation Time: 8:00 am

Keywords:

Polyacrylamide, smectite, illite, kaolinite