
Cationic Spin Probes on Hectorite Surfaces: Demixing and Mobility as a Function of Adsorption Level¹

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Abstract: The electron spin resonance (ESR) technique has been used to study the motion and segregation of an organic spin probe cation (4-amino-2,2,6,6-tetramethylpiperidine N-oxide) on K⁺-hectorite as a function of average surface concentration. The organic cation tends to concentrate in certain interlayers of aqueous hectorite suspensions even when it occupies a small fraction of the cation-exchange sites. This demixing effect is not evident in methanol-solvated hectorite. The average mobility of the probe increases at higher adsorption levels as a result of the shift of the equilibrium in favor of the solution state. Calculated time-averaged orientations of the probe on the clay surfaces are quite different for methanol- and water-solvated systems, emphasizing the importance of the solvent in modifying the surface-cation interaction.

Key Words: Adsorption • Cation Spin Probe • ESR • Hectorite • Organic Cation • TEMPAMINE⁺

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