

Dynamics of Interlayer Cations in Tetramethylammonium-Saponite Studied by ^1H , ^2H NMR, and Electrical Conductivity Measurements

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We observed ^1H and ^2H NMR spectra, ^1H NMR spin-lattice relaxation times, and electrical conductivities of water-saturated and anhydrous tetramethylammonium(TMA)-saponites between 100 and 415 K. The very weakly bound cations produced narrow ^1H and ^2H NMR lines observed in both specimens down to 150 K. The temperature dependence of the ^1H NMR spin-lattice relaxation times in the water-saturated and anhydrous samples gave asymmetric minima attributable to the heterogeneous overall rotation and self-diffusion of the cations. The inhomogeneity of the cationic motions in the anhydrous TMA-saponite was greater than in the water-saturated one. From measurements of the electrical conductivity of anhydrous TMA-saponite a large anisotropic cation-diffusivity was concluded.

Key words: Saponite; Cation Dynamics; NMR; Electrical Conductivity; Intercalation.

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