
Intercalation of Salts of Fatty Acids Into Kaolinite

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Abstract: Intercalation of sodium and potassium salts of lauric, myristic, palmitic, elaidic, oleic, 12-hydroxystearic, and a blend of C₈– C₁₀ acids in kaolinite has been followed by X-ray powder diffraction, nuclear magnetic resonance (NMR), Fourier-transform infrared spectroscopy, and thermal studies. The 7- Å 'c' axis spacing in kaolinite expands to 11 Å as a result of intercalation; this expansion is independent of the alkyl chain length of the fatty acid. The orientation of the organic molecules in the kaolinite interlayer is nearly flat, and ¹H NMR indicates an enhanced ordering in the potassium laurate intercalate. The reversal or equalization of the relative intensities of hydroxyl bands at 3696 and 3619 cm⁻¹ of kaolinite are related to the phenomenon of intercalation. The decomposition temperature of these salts decreases when they are intercalated in kaolinite.

Key Words: Fatty acid • Fourier-transform infrared spectroscopy • Intercalate • Kaolinite • Nuclear magnetic resonance • Orientation • X-ray powder diffraction

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