
Thickness and Surface Characteristics of Colloidal 2:1 Aluminosilicates Using an Indirect Fourier Transform of Small-Angle X-ray Scattering Data

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Abstract: An indirect Fourier transformation applied to small-angle X-ray scattering data has been used to determine the thickness and surface properties of two common clay minerals. For an illite system, the particle density distribution function (PDDF) generated by the analysis gave a correct description of particle geometry, and the calculated electron density profile was in accordance with the theoretical electron density distribution for this mineral. This approach provides the opportunity to determine the thickness of fundamental particles of illite while avoiding the difficulties encountered in other methods. Both the PDDF and the electron density profile accurately predict the thickness of Na-montmorillonite layers, and the results suggest that an electron inhomogeneity exists at the interface of this mineral.

Key Words: Illite • Indirect Fourier Transform • Montmorillonite • SAXS • Thickness

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