
Quantification Curves for Mica/Smectite Interstratifications by X-ray Powder Diffraction

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Abstract: X-ray powder diffraction (XRD) patterns for many interstratified mica/glycolated smectites were calculated by changing combinations of probabilities and transition probabilities of two-component layers. Three basal XRD reflections, $5.1^\circ - 7.6^\circ$ 2θ (p_1), $8.9^\circ - 10.2^\circ$ 2θ (p_2), and $16.1^\circ - 17.2^\circ$ 2θ (p_3) were selected for the quantification curves. A distinct relationship exists between $\Delta 2\theta_1$ ($p_2 - p_1$) and $\Delta 2\theta_2$ ($p_3 - p_2$) which shows systematic changes with expandability at constant Reichweite values. The calculated values were plotted with $\Delta 2\theta_1$ and $\Delta 2\theta_2$ as the axes of coordinates, and quantification curves were calculated. The components and stacking parameters of mica/smectites were estimated easily using this diagram. Probabilities of existence of component layers and their transition probabilities for Reichweite ($R=0$) and ($R=1$) structures, and special cases of $R=2$ and $R=3$ structures were obtained.

Key Words: Ethylene glycol • Interstratification • Mica/smectite • Reichweite structures • X-ray powder diffraction

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