
Quantification Curves for the X-Ray Powder Diffraction Analysis of Mixed-Layer Kaolinite/Smectite

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Abstract: X-ray powder diffraction patterns for many interstratified kaolinite/glycolated smectites were calculated by changing combinations of probabilities and transition probabilities of two component layers. Reichweite = 0 and Reichweite = 1 structures were investigated. The calculated d-values were plotted, with P_{KS} (the probability that a smectite layer succeeds a kaolin layer given that the first layer is a kaolinite layer) and P_{SK} as the axes of coordinates. These d-values were then linked into equal d-value curves on a graph. Four equal d-value diagrams for mixed reflections ranging from 34.0 to 17.1 Å, from 8.5 to 7.2 Å, from 6.13 to 5.68 Å, and from 3.540 to 3.401 Å were constructed. Two examples of identifying natural kaolinite/smectite minerals using these diagrams are presented.

Key Words: Ethylene glycol • Interstratification • Kaolinite/smectite • Mixed-layer quantification • X-ray powder diffraction

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