A Simple Technique for Identification of One-Dimensional Powder X-Ray Diffraction Patterns for Mixed-Layer Illite-Smectites and Other Interstratified Minerals

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Abstract: A very simple technique is proposed for a quantitative or semiquantitative interpretation of X-ray diffraction (XRD) patterns for two-component mixed-layer structures. It is suitable for a determination of the Reichweite (R) values and proportions of component layers from graphical simulations of basal peak positions for mixed-layer structures with definite layer types. This technique can be successfully used for illite-smectites, but the accuracy of the results obtained for other mixed-layer structures is somewhat lower. In addition to the graphical technique, simple linear relationships are proposed for the calculation of layer proportions. Such relationships can be easily obtained for any mixed-layer structure with any R and any thicknesses of interstratified layers.

Structural parameters reported in the literature for mixed-layer illite-smectites, kaolinite-smectites, etc., were used to check the reliability of the method presented. It is concluded that the technique works well and produces parameters that are in agreement with those published.

Key Words: Identification • Illite-smectite • Interstratification • X-ray diffraction

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