
Activity/Composition Relations among Silicates and Aqueous Solutions: II. Chemical and Thermodynamic Consequences of Ideal Mixing of Atoms on Homological Sites in Montmorillonites, Illites, and Mixed-Layer Clays

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Abstract: The activities of thermodynamic components of clay minerals corresponding in composition to pyrophyllite, muscovite, paragonite, and margarite were computed from chemical analyses reported in the literature assuming ideal mixing of atoms on homological sites in the minerals. These activities were then used to generate stability fields for smectites, illites, and mixed-layer clays on logarithmic activity diagrams representing equilibrium among minerals and aqueous solutions at 25° C and 1 bar. Comparative analysis indicates that the approach affords close approximation of both mineral and water compositions in geologic systems.

Key Words: Activity • Atom mixing • Illite • Mixed layers • Montmorillonite • Thermodynamics

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