
Beidellite and Associated Clays from the DeLamar Mine and Florida Mountain Area, Idaho

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Abstract: There has been much interest in the rare specimen of beidellite from the Black Jack Mine, Florida Mountain, Idaho. A variety of aluminous clays exists along veins such as the Black Jack vein, in rhyolite and latite flows, and in near-surface ash beds, often containing less than 1.0% MgO and 0.5% Na₂O. Associated clays include beidellite, illite, kaolinite, 10-Å halloysite, dickite, nacrite, rectorite and a tarasovite-like mineral. The predominant clay is mixed-layer illite-beidellite. The beidellites have Al₂O₃ contents ranging from about 28 to 33%, and predominantly Ca and K as interlayer cations. The typical beidellite dehydroxylation temperatures of about 595 ° C readily differentiate the beidellite from montmorillonite, which has a dehydroxylation temperature in the range of 735 ° C. A modified differential thermal analysis (DTA) method is given for readily estimating the interlayer cation populations of smectites, including Mg⁺⁺ and Al⁺⁺⁺ cations. Chemical analyses and layer charges of 11 beidellites from mines around the Black Jack Mine are given. The beidellites have an American Society for Testing and Materials (ASTM) classification of CH, φ value, internal friction angle of about 8° and an expansion pressure of about 9 kgf/cm² (88.3 kPa), similar to that of nontronite.

Key Words: Beidellite • Clay Chemistry • Differential Thermal Analysis • Illite-Beidellite • Rectorite • X-ray Powder Diffraction

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