
Fe³⁺-Rich Montmorillonite-Beidellite Series in Ayvacik Bentonite Deposit, Biga Peninsula, Northwest Turkey

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Abstract: The Ayvacik bentonites, products of Miocene calc-alkaline volcanic rocks, are composed of smectite of the montmorillonite-beidellite series. Fault-related hydrothermal solutions have altered andesitic rocks to dioctahedral smectites. Differences in the micro-morphology of the two end-members are distinguished by scanning electron microscopy (SEM) studies. The beidellite particles are of delicate ribbons and rosette habits, whereas montmorillonite particles are very thin, curled sheets and flakes. Clay size (<2 µm) fractions contain (in wt. %) 54.90– 56.80 SiO₂, 19.65– 28.54 Al₂O₃, 0.45– 6.28 Fe₂O₃, 0.10– 1.72 CaO, 0.80– 4.15 MgO, 0.55– 1.88 K₂O, and 0.08– 1.15 Na₂O, which confirm that the beidellites are Fe-rich (5.06– 6.28 wt. %), except for one sample (0.45 wt. % Fe₂O₃). The Greene-Kelly test (Li-saturation and heating) gave very good results for the measurement of the *d*(001) of the two end-members. Nickel, Ti, and Cr enrichment in smectite is related to the chemical composition of hydrothermal solutions that passed through the ophiolite complex.

Key Words: Biga Peninsula • Fe-rich Beidellite • Montmorillonite • Turkey

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