
Ca-Rectorite from Sano Mine, Nagano Prefecture, Japan

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Abstract: Rectorites containing various amounts of Ca were found at the Sano Mine, Nagano Prefecture, Japan. The Ca content in nonexchangeable form varied from 1.0 to 3.9% CaO. With more than 3.4%, they may be called Ca-rectorite. Chemical data of the most Ca-rich sample showed that Ca was the dominant interlayer cation, and gave a structural formula of $(\text{Mg}_{0.16})_{\text{EX}}(\text{Ca}_{0.59}\text{Na}_{0.27}\text{K}_{0.17})_{\text{FIX}}[\text{Al}_{3.94}\text{Mg}_{0.08}\text{Fe}_{0.07}\text{Ti}_{0.01}](\text{Si}_{5.85}\text{Al}_{2.15})\text{O}_{20}(\text{OH})_4$. This sample is apparently the most Ca-rich rectorite reported to date. The Greene-Kelly test and an intercalation examination by octadecylammonium indicated that the expandable component layers were beidellitic. Assuming the tetrahedral composition of the expandable component layers are similar to the average tetrahedral composition of beidellite of $(\text{Si}_{3.6}\text{Al}_{0.4})$, the tetrahedral composition of the mica-like component layers was calculated to be $(\text{Si}_{2.25}\text{Al}_{1.75})$. This was closer to a brittle mica (margarite) than to a true mica. Examination of chemical data for several Ca-rectorite samples from different localities, including those from the Sano Mine, showed a trend of increasing Ca content as Al increased and Si decreased. Ca-rectorite exhibited characteristic infrared absorption bands at 480, 670–700 and 900–930 cm^{-1} , which became more intense as Ca content increased. These bands also corresponded to major absorption bands of margarite.

Key Words: 2:1 Layer Silicate • Margarite • Rectorite • Regular Interstratification • Smectite/Brittle Mica

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