
The Dependence of Localized Crystallization of Halloysite and Kaolinite on Primary Minerals in the Weathering Profile of Granite

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Abstract: The formation of kaolin-group minerals in the weathering profile of granite, under the humid, temperate climate as found in Korea, was studied by X-ray diffraction (XRD), scanning electron microscopy (SEM), and electron microprobe analysis (EMA). The granite was gradually weathered to saprolite. K-rich feldspar was not weathered in the profile, but plagioclase partially weathered to halloysite septa (*i.e.*, wall-like masses). At the bottom of the profile, biotite had weathered to regularly interstratified biotite-vermiculite (B-V), and subsequently to kaolinite, with a considerable increase in grain volume. In the upper part of the profile, loose aggregates of transported clays, including halloysite and kaolinite, coated the preformed halloysite septa in the weathered plagioclase. Halloysite had precipitated as a metastable phase in the microfissures of partially weathered plagioclase. Kaolinite had precipitated heavily in the weathered biotite, where surfaces supply abundant templates facilitating the nucleation of kaolinite. The localized crystallization of halloysite and kaolinite, depending on the distribution of primary minerals, strongly influenced the kaolin mineralogy of the granite weathering profile.

Key Words: Biotite • Granite • Halloysite • Kaolinite • Weathering

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