
Microtopography of Regularly-Interstratified Mica and Smectite

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Abstract: The gold decoration technique of electron microscopy was used to observe the microtopography of natural (001) surfaces of 1:1 regularly-interstratified mica/smectite minerals (expandable layer: 40– 45%) collected from four different pyrophyllite deposits in Japan. The specimens are characterized by parallel growth steps of malformed, circular or polygonal forms with varying step separations. Many particles exhibit paired steps that seem to show spiral growth. Microtopographic observations suggest that the growth of regular interstratification (at least for the specimens investigated in this study) normally takes place by an interlacing of paired steps. If the height of a single step corresponds to that of a mica or a smectite layer, the particles are estimated to be normally 40– 300 Å in thickness. If the particles on which a spiral center is observed are single crystals of interstratified mica and smectite, then some crystals investigated in this study are far thicker than fundamental particles. The results of this study are interpreted to suggest that these regularly-interstratified mica/smectites were formed by hydrothermal metasomatism from their respective host rocks.

Key Words: Au-decoration • Electron microscopy • Fundamental particles • Interstratified mica/smectite • Surface microtopography

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