

Far infrared spectra of K⁺ in dioctahedral and trioctahedral mixed-layer minerals

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ABSTRACT

Mixed-layer minerals were analyzed by far infrared (FIR) spectrometry. The FIR spectra show two bands, which occur at 84–87 and 108–114 cm⁻¹ for mixed-layer illite-smectite (I-S) and at 71–79 and 103 cm⁻¹ for mixed-layer phlogopite/vermiculite (P-V). The 103 cm⁻¹ band seen in the P-V series from Palabora is independent of K⁺ content and is attributed to lattice vibrations. The lower wavenumber band observed at 85 cm⁻¹ for I-S mixed-layers and 71–73 cm⁻¹ for P-V mixed-layers corresponds to K⁺ fixed in the two-layer stacking sequences. This low wavenumber band shifts to higher wavenumbers as the thickness of coherent scattering domains increases: shifting toward 97 cm⁻¹ for the illite end-member of the I-S series and to 79 cm⁻¹ for Palabora phlogopite, the end-member of the P-V series.