

Far infrared spectroscopy of carbonate minerals

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ABSTRACT

This study presents far infrared spectra in the range 650–70 cm^{-1} of 18 common and rare carbonate minerals. Mineral samples of known provenance are selected and physically characterized to determine the purity of the crystalline phase and their composition. The fine ground mineral powders are embedded in polyethylene pellets, and their transmittance spectra are collected with a Fourier spectrometer. The far infrared spectra of different carbonate minerals from the same structural group have well-defined similarities. Observed shifts generally manifest the mass effect of the constituent metal cations. Remarkable spectral differences occur for different carbonates in the far IR region and may serve as fingerprints for mineral identification and are more useful identifiers of carbonate species than those in any other infrared range. For some of the minerals studied here, like kutnohorite, artinite, gaylussite, and trona, no far infrared spectra to that extent (up to 70 cm^{-1}) have been found in literature.

Keywords: IR spectroscopy, far infrared, transmittance spectra, carbonate minerals