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Electrolytic coloration and spectral properties of natural calcite crystals

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Abstract

Natural colorless calcite crystals are colored electrolytically by using a pointed cathode and a flat anode at various temperatures and voltages. Ca^+ and CO_3^- color centers, Ca^{2+} vacancies, and CO_3^{2-} units are produced in colored crystals. Absorption spectral bands of the Ca^+ and CO_3^- color centers, Ca^{2+} vacancies, and CO_3^{2-} units are reported for the colored crystals at room temperature. Pb^{2+} spectral bands are observed in absorption and fluorescence spectra of uncolored and colored crystals. The current-time curve for electrolytic coloration of natural calcite crystal and its interpretation with respect to the electrolytic coloration process are given. Creation and conversion of color centers are explained.

Keywords: Calcite crystal, electrolytic coloration, color center