

Effect of Rare Earth Impurities on the Growth of Ammonium Oxalate Monohydrate Single Crystals

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Abstract

Single crystals of Ammonium Oxalate monohydrate (AO) were grown from aqueous solution in pure form and in presence of Ethylenedinitrilotetraacetic acid (EDTA) and some rare earth impurities like Sm⁺³, La⁺³, Gd⁺³ by the slow cooling method. Well faceted AO crystals with the dimensions of 1.0 x 1.0 x 2.0 cm³ were obtained. X-ray diffractometry, Fourier transform infrared (FT-IR) spectroscopy and Vicker's microhardness measurements were carried out to study the structural and mechanical properties of the grown crystals. FT-IR spectra confirmed the presence of different vibrational modes of oxalate group in the grown samples. X-ray diffraction analysis confirmed the crystalline structure of the grown samples of which the pure specimen showed good agreement with the standard data. The microhardness study showed a significant increase in hardness values of AO crystals grown in presence of impurities.