

Growth and Characterization of a New Inorganic NLO Crystal for Efficient Second Harmonic Generation (SHG)

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Abstract: *Materials with large nonlinear optical susceptibilities are of current interest in the area of harmonic generation and optical modulation. Materials showing high optical non linearity have potential applications in signal transmission, data storage, optical switching, laser printing, displays, inflorescence, photolithography, remote sensing, chemical and biological species detection, high resolution spectroscopy, medical diagnosis and underwater monitoring & communication. In recent few years, several novel NLO crystals have been developed for efficient second-harmonic generation (SHG) and other parametric processes. In the inorganic family crystals, borate crystals have attracted much attention due to their instinctive properties. Such a new inorganic nonlinear optical single crystal of Magnesium Cadmium Borate (MCB) has been successfully grown from aqueous solution using the slow evaporation technique at room temperature. The crystals obtained using the aforementioned method were characterized using different techniques. The crystalline nature of the as-grown crystal of MCB was analyzed using powder X-ray diffraction. The optical transmission study of the MCB crystal revealed high transmittance in the entire UV-VIS region, and the lower cut-off wavelength was determined to be 230 nm. The presence of functional groups has been estimated qualitatively from the Fourier transform infrared spectroscopy. The frequency doubling property of NLO crystal was verified through second harmonic generation (SHG) studies.*

Keywords: Nonlinear optical material, powder X-ray diffraction analysis, UV optical studies, second harmonic generation