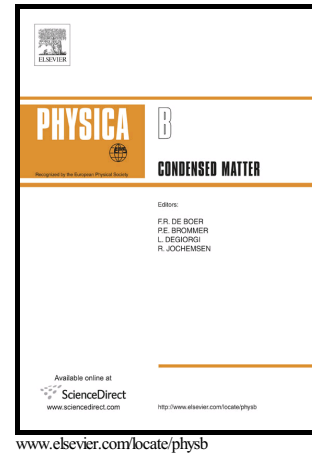


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Growth, Structural, Thermal, Dielectric and Nonlinear Optical properties of Potassium hexachloro Cadmate (IV) a novel single crystal

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Abstract

The Potassium hexachloride cadmate (IV) (PHC) single crystal was grown from the aqueous of the solution by a controlled evaporation method. Single crystal XRD solved the structure. FTIR is used to identify the functional groups of grown crystal. The UV-Vis-NIR spectrometer was used to find out the UV cut off region and to calculate the optical band gap of the Potassium hexachloride cadmate (IV) single crystal. The EDAX spectrum has been used to identify the compounds present in title compound. The TG-DTA profile shows the thermal stability of the grown crystal of Potassium hexachloride cadmate (IV). The Vicker's hardness measurement was used to calculate the material hardness of the title compound. The dielectric loss and constant varied with frequencies and activation energy is also calculated. The solid state parameters like plasma energy, Penn gap, Fermi energy, electronic polarizability using Penn analysis and electronic polarizability has also calculated for the title compound. The Z-scan technique is used to calculate the third order nonlinear susceptibility of a real and imaginary part.

Keywords: Crystal growth, Single crystal X-ray diffraction, UV-Absorption, EDAX, Etching, Z-scan

1 Introduction

In the present day scenario Nonlinear Optics has the highest efficient that caters to a numerous scope in the research due to its immense application in the field of optical fibre communication, solid state laser, information storage, bar code laser scanner, compact disc player, optical switching and frequency conversion [1-7]. Organic materials have superior nonlinear properties whereas, lack in mechanical and thermal stability. Conversely, inorganic materials are evident for their mechanical and thermal stability but it show low nonlinear optical (NLO) properties. On the other hand semi organic materials found to show a superior

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