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SYNTHESIS AND CHARACTERIZATION OF TRIGLYCINE SULPHATE CRYSTALS DOPED WITH POTASSIUM SUCCINATE

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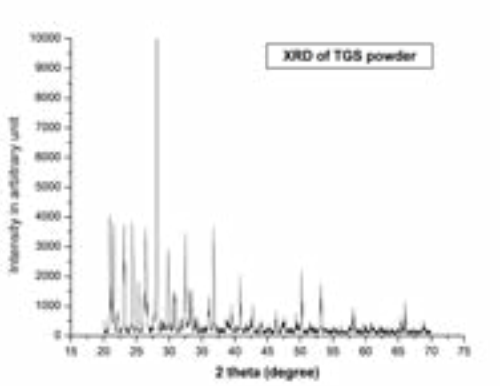
Tri glycine sulphate $(NH_2CH_2COOH)_3.(H_2SO_4)$ (TGS) is a ferroelectric and pyroelectric crystal which is mainly used for infrared detector applications. The b axis of TGS is the ferroelectric axis (axis of spontaneous polarization) and along this axis it exhibits maximum pyroelectric coefficient of ~ 3 × 10-2 μC cm-2 K-1 at room temperature [1]. Due to this reason the (010) face assumes importance in the morphology of TGS crystal. The work described in the present report is an attempt to study the evolution of the morphology of TGS crystal in general and (010) face area relative to other faces in particular and also to characterize the grown crystal for its phase and optical homogeneity using X-ray diffraction and optical interferometric techniques. Also to study the effect of dopping of TGS with potassium succinate. TGS is known to undergo a second order (order-disorder type) continuous phase transition at the Curie temperature (Tc) of 49°C. Below this temperature the crystal exhibits ferroelectric phase whereas above it the crystal gets transformed to the paraelectric phase [2]. It belongs to monoclinic system below and above the Curie temperature. It has space group P21 in the ferroelectric phase and cento-symmetric space group P21/m in the paraelectric phase [3]. The lattice parameters of TGS are a=9.41Å, b=12.64 Å, c=5.73 Å and β=110°23' [4]. Due to its self poling nature it does not require any specific poling when it is cooled from the high temperature phase to the low temperature one. Taking advantage of this characteristic of TGS, and the fact that across the Curie temperature the dipole moments of the domains will behave differently which will influence the growth rate of the (010) polar face, we have attempted to grow TGS crystal . The morphology of TGS crystal in general and (010) face in particular is studied. Also we attempted to study doping induced morphological changes of TGS using Potassium Succinate as dopant.



Recent Publications

1. Vijeesh P, Dr. Annieta Philip K, Dr. Supriya M.H (2016) Growth and growth rate analysis of potassium succinate crystal. N.S.C.G.A, Bhabha Atomic Research Center, Mumbai, India
2. Vijeesh P, Paulbert Thomas, Dr. Annieta Philip and Dr. Supriya M.H (2016), Growth rate analysis and material characterization of potassium succinate crystal. Smart Materials for Futuristic Electronics and Communication Technology, The Cochin College, Kochi-2.

Biography

Vijeesh P has his expertise in synthesis and characterization of Non linear optical materials and their characterization. He designed a crystallizer for slow cooling solution growth for the synthesis of the materials. And also designed a temperature controller for slow cooling of the solution. He is an Assistant Professor in Physics, Department of Physics, The Cochin College, India. He presently doing his research in Department of Electronics , The Cochin University of Science and Technology. He got slected for research fellowships by Indian Academy of Science and did research work in Raja Ramanna Center for Advanced Technology, India.

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