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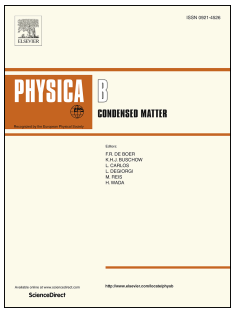

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Investigation of inorganic nonlinear optical Potassium Penta Borate Tetra Hydrate (PPBTH) single crystals grown by slow evaporation method

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Abstract

Borates family crystals were plays vital role in the field of non linear optics (NLO) due to needs of wide range of applications. In this report, NLO crystals (potassium penta borate tetra hydrate ($KB_5H_8O_{12}$) are grown by slow evaporation method at room temperature (28^o C) and studied their physical properties. The harvested single crystals are transparent with the dimension of 12 x 10 x 6 mm^3 and colourless. X-ray diffraction of single crystals reveals that the grown crystal belongs to orthorhombic system with non-centrosymmetric space group Pba2. All the absorbed functional groups are present in the order of inorganic compounds expect 1688 cm^{-1} because of water (O – H - O blending) molecule present in the pristine. Crystals show transparent in the entire visible region with 5.9 eV optical band gap and also it shows excellence in both second and third order nonlinear optical properties. Crystals can withstand upto 154°C without any phase changes which is observed using thermal (TGA/DTA) analysis.

Key Words : Slow evaporation method; nonlinear optical materials; non-centrosymmetric Kurtz-Perry powder test; Z-scan study; TG-DTA.

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