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Synthesis, structural elucidation, thermal, mechanical, linear and nonlinear optical properties of hydrogen bonded organic single crystal guanidinium propionate for optoelectronic device application

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Abstract

A new nonlinear optical single crystal of Guanidinium Propionate (GP) has been grown from the aqueous solution by slow evaporation method. Orthorhombic structure with Pbc_a space group was confirmed by single crystal XRD. The crystal packing is identified to be stabilized through three dimensional hydrogen bonding network between cation and anion N–H···O hydrogen bonds leading to three ring motifs viz. R₁²(4), R₂¹(6) and R₂¹(6). The grown crystals were characterized by thermal, mechanical, dielectric and optical studies. The third order nonlinear optical properties such as nonlinear absorption coefficient, nonlinear refractive index and susceptibility were calculated by Z-scan technique.

Keywords

Crystal structure, Hydrogen bonding interaction, Thermal analysis, Mayer Index

Dielectric constant, Nonlinear Optics

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