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# Synthesis, Spectral analysis, Optical and Thermal properties of new organic NLO crystal: N,N'-Diphenylguanidinium Nitrate (DPGN)

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**Abstract**

A new organic NLO material N,N'-Diphenylguanidinium Nitrate (DPGN) single crystal was grown by slow evaporation technique using methanol as solvent. Single crystal X-ray diffraction and powder X-ray diffraction experiments were carried out in order to confirm the structure and crystalline nature of DPGN crystal. Wide band gap of 3.9 eV with transmittance of 57% up to 800 nm is observed for the grown crystal using UV–vis spectral analysis. The chemical bonding and presence of various functional groups were confirmed by the FT-IR and FT-Raman spectral studies. The thermal behavior of DPGN crystal was analyzed by simultaneous TG-DTA studies. The second harmonic generation (SHG) nonlinearity of the grown crystal was measured by Kurtz and Perry powder technique and was found to be comparable with that of the standard reference material potassium dihydrogen phosphate (KDP) crystal.

**Keywords:** Powder X-Ray diffraction, Spectral analysis, nonlinear optical material.

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