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Synthesis, crystal growth and spectroscopic investigation of second order organic nonlinear optical single crystal: 2-Chloro-N-[4-(dimethylamino)benzylidene]aniline

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Abstract

Organic nonlinear optical (NLO) crystal 2-Chloro-*N*-[4-(dimethylamino)benzylidene]aniline (2Cl4DBA) was synthesized and grown by restricted slow evaporation technique at room temperature using acetone as solvent with good degree of transparency. The lattice parameters were determined and found to be noncentrosymmetric orthorhombic system by single crystal X-ray diffraction. The crystalline nature of the synthesized material was recorded by the powder X-ray diffraction pattern. Molecular structure of the grown crystal was investigated by ^{1}H and ^{13}C NMR and functional groups were identified by FTIR spectrum analysis. The optical absorbance of the grown crystal was ascertained by recording UV-Visible spectrum. Thermal and physiochemical stability of the grown material was investigated by TG/DTA analysis. SHG efficiency was determined by Kurtz-Perry Powder SHG technique and found to be 4.2 and 1.54 times greater that of standard KDP and urea crystals respectively.

Keywords: Slow evaporation technique, nonlinear optics, X-ray diffraction, NMR, organic compounds.

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