NONLINEAR OPTICAL PROPERTIES OF CHALCONES

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Recent developments in the field of nonlinear optics (NLO) has pushing second and third-order nonlinear optical materials into practical applications and devices, such as photodynamic therapy, up-conversion lasing, optical-limiting, optical data storage, 3D microfabrication and two-photon excited fluorescence microscopy. Chalcones are α,β-unsaturated ketones with two aromatic rings interconnected by an enone having diverse array of substituents. They are natural phenols and form the central core of wide spectral of biological compounds. Chalcones derivatives have long been used in nonlinear optics due to the fact they permit the modification of the substituents connected to the aromatic ring and the consequent change in the optical properties of the material. In this work, we present the spectra of absorbance and first NLO results of three types of chalcones ($C_{15}H_{12}O, C_{16}H_{14}O_3, C_{16}H_{14}O_2$) that were characterized with two NLO techniques: Hyper-Rayleigh Scattering (HRS) and Z-Scan, which allowed us to determine the first hyper-polarizabilities and the spectral two-photon (2PA) absorption cross-sections, respectively. The results of the NLO study using chalcones by linear and nonlinear techniques revealed that the presence of the substituents OH and OCH_3 connected to the aromatic ring of the beta carbon changes the values of the 2PA cross section and the first hyperpolarizabilities.
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