

HYPERPOLARIZABILITY OF BENZOTHAZOLIUM SALTS FOR INTEGRATED MICRO/NANO OPTICS

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Abstract

Compounds with high hyperpolarizability are the subject of intense studies because of their potential application in modern communication technologies involving optical data processing, transmission, or storage, where they gradually replace classical electronic devices. A first order hyperpolarizability of benzothiazolium-substituted conjugated donor--acceptor dipoles are determined within this work. The first order hyperpolarizability is determined by the hyper-Rayleigh scattering (HRS) method i.e. by the second order harmonic light scattering in solutions. The HRS signal is generated in methanol and dimethylsulfoxide solutions of benzothiazolium salts by focusing high intensity femtosecond laser beam into the samples. The 800 nm, 1300 nm and 1340 nm output wavelengths of a Ti:Sapphire laser system and an optical parametric amplifier are used as the pump source. The second-order nonlinear optical response is detected at 400 nm, 650 nm and 670 nm. First hyperpolarizabilities are subsequently determined by using the internal and external reference method and their values were determined in a range from 133 to 563 esu.

Keywords: Hyper-Rayleigh Scattering, First Order Hyperpolarizability, Benzothiazolium Salts

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