

THIRD ORDER OPTICAL NONLINEARITY OF LINEAR FUSED RING DICHLORO-SUBSTITUENT CHALCONE ISOMERS

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ABSTRACT- The third-order nonlinear optical response of halogen anthracenyl chalcone isomers in dimethyl sulphonate (DMSO) as the solvent has been studied via single beam Z-scan technique at 532 nm of laser excitation wavelength. The magnitude and sign of the nonlinear refractive index, n_2 and the nonlinear absorption coefficient, β were determined. It was observed from the closed aperture z-scan that the samples exhibited a self-focusing effect with a negative n_2 . The n_2 is found to be of the order of 10^{-8} cm²/W. Open z-scan results showed that both samples exhibited reverse saturable absorptions with significant β . The magnitude of β is of the order of 10^{-4} cm/W. Optical limiting studies shows a decrement in transmittance as a function of input fluence. Optical limiting action begins at as low as 50 kW/cm² of focal input intensity which is ideal for low powered continuous wave laser limiting applications. These attractive third-order nonlinear properties suggest that the compound can be a good candidate for optoelectronic and photonics application.

Keywords: z-scan technique, nonlinear absorption, nonlinear refraction, chalcone isomers.