Nanooptics and photonics

Optimization of Nonlinear Optical Properties in Conjugated Azo-Based Compounds

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New generation of optoelectronic devices for communications, optical switching and information storage require the development of efficient materials with exceptional optical and nonlinear optical (NLO) properties. Some organic NLO materials offer advantages as compared with inorganic materials, due to their larger electro-optic coefficients, faster response time, larger bandwidth, lower drive voltage, lower dielectric constant and high laser damage threshold. The development of efficient organic and/or hybrid organic/inorganic NLO materials for optoelectronic applications has drawn considerable attentions over the last decades. The optimization of molecular structural properties is essential prerequisite to the design of efficient material with high nonlinearities.

Azobenzenes that are functionalized with an electron-donor and/or electron-acceptor groups have attractive optical and nonlinear optical properties [1,2]. Due to photoinduced trans-cis isomerization, azobenzenes are interesting for a variety of novel and useful applications: photopoling, optical storage, grating formation. This study is devoted to the understanding of the relationship between chemical structure of azo-based derivatives and their nonlinear optical properties in order to optimize these molecular materials for application in photonics.

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