Exploring the Relationship Between Molecular Structure and Nonlinear Optical Properties in Organic and Organometallic Compounds

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Abstract

Research on nonlinear optical (NLO) properties in highly conjugated organic and organometallic compounds, as well as in self-assembled photonic structures, is rapidly expanding and plays a pivotal role in the progress of emerging photonic technologies. Molecular engineering is key to developing novel materials with exceptional NLO characteristics, enabling advancements in optical communication, switching, data storage, and optical limiting applications [1].

In recent years, considerable attention has been devoted to organic materials, polymers, organometallic compounds [2], and metal coordination complexes in both experimental and theoretical studies, driven by their promising applications in photonics and optical technologies [3–4]. The results obtained demonstrate that the studied organic compound exhibits notable nonlinear optical properties when deposited as thin films via Physical Vapor Deposition (PVD) and spin-coating techniques. These findings highlight the compound's potential as a strong candidate for the development of optoelectronic devices.

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