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83

Study of two-photon absorption in sulfonated imidazopyridines with different peripheral groups

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Organic compounds have gained significant importance in photonics research due to their potential applications in bioimaging through two-photon absorption (2PA) fluorescence microscopy, photodynamic therapy, and fluorescent probes for use in biological environments. Specifically, molecules derived from imidazopyridines have emerged as promising candidates for applications in biology and medicine due to their high optical response, which arises from extensive electron delocalization, isosterism with DNA and RNA bases (purines), and tautomer formation in excited states. (1) This work aims to study and quantify the linear and nonlinear absorptive characteristics of a series of sulfonated imidazopyridines, as well as the dynamics of their excited states, considering the potential contributions of various peripheral groups involved in these properties. The characterization will involve various experimental techniques, including UV-Vis spectroscopy, fluorimetry, z-scan, and pump-probe experiments, complemented by theoretical simulations using Density Functional Theory (DFT). So far, the results demonstrate a reasonable agreement between simulated and experimental absorption spectra and dipole transition moments, fluorescence in some compounds, and two-photon cross-sections close to 40 GM. These findings suggest the potential utility of these compounds for optical applications.

Palavras-chave: Z-Scan; Imidazopyridine; Nonlinear absorption.

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