Investigation of Nonlinear Absorptive Responses in Sulfonated Imidazopyridines with Different Peripheral Substituents

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Organic molecules are essential in photonics for tracking biological activities with fluorescent markers and conducting bioimaging via two-photon absorption fluorescence microscopy. Imidazopyridine-based molecules are particularly notable, showing promise for biological and medical applications due to their wide-ranging optical properties, which stem from significant electron delocalization and the ability to form tautomers in excited states. [1,2] This research is dedicated to assessing the linear and nonlinear absorption features of sulfonated imidazopyridines, as well as examining the excited state dynamics. The study employs a variety of experimental approaches, including UV-Vis spectroscopy, fluorometry, z-scan, and pump-probe experiments, complemented by theoretical modeling using Density Functional Theory (DFT). The preliminary results demonstrate a strong correlation between the theoretical and observed absorption spectra, molecule-specific fluorescence, and two-photon cross-sections approaching 40 GM. These findings indicate the potential of these compounds for use in imaging applications.

References

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