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Effect of dimethylamine group on the nonlinear optical properties and fluorescence enhancement of acetamide-chalcone derivatives

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Here it was studied the influence of eight peripheral groups on the photophysical and nonlinear optical properties of acetamide-chalcone derivatives. Nonlinear optical measurements such the tunable Z-Scan technique and fluorescence through multiphoton excitation (MPE) were performed in femtosecond regime. (1-2) Results revealed that the incorporation of the dimethylamine group led to large fluorescence quantum yield (71% in DMSO solution) that can be triggered by MPE, which is important for biological applications. Furthermore, dimethylamine also red-shifts the lower energy band by about 90 nm, increasing its two-photon absorption cross-section by more than 100% regarding the other studied molecules of this work. Besides, all compounds displayed two-electronic states observed through one and two-photon absorption spectroscopy and confirmed by Quantum Chemistry Calculations (QCCs). The Sum Over States approach was used to model the two-photon absorption cross section spectrum of all compounds which showed a strong dependence between the coupling of the ground state with the first excited state. (3)

Palavras-chave: Acetamide-chalcones. Two-photon cross-section. SOS model.

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