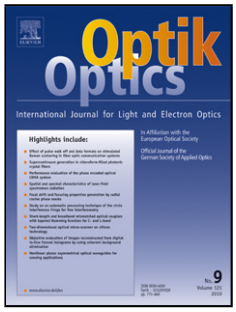

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Investigation on three-photon absorption induced upconversion fluorescence properties of two fluorene-based derivatives

Li Guo Feng, Liu Jun Hui*

Henan University, Kaifeng, Henan Province, 475004, P. R. China

* email: computation_henu@126.com

Telephoton:+8613503780268

Abstract: Steady state florescence and three-photon-absorption-induced upconversion fluorescence of two fluorene-based derivatives with different electron donors were investigated. The upconversion fluorescence intensity is cubic with the input intensity. The electron donors have great impact on the upconversion fluorescence property. The transition processes of the two molecules were investigated with TD SCF/DFT theory methods, the results of theory and experiments accord well with each other.

Key words: three-photon absorption; upconversion fluorescence; fluorescence life-time; electron transition.

1.Introduction

Transforming near infrared irradiation into visible or ultraviolet irradiation is required in many fields such as data storage, fluorescence imaging, optical sensor and so on.[1-4] So far, these investigations mainly focused on second harmonic, third harmonic, etc. However, relatively small nonlinear coefficients of current materials have deferred their practical applications. Another feasible method is multiphoton-absorption-induced upconversion fluorescence, by which large nonlinear absorption and