

研究论文

含有三苯胺单元的萘酰亚胺化合物的合成及其荧光调控研究

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摘要 通过在1,8-萘酰亚胺发光单元上引入三苯胺单元, 合成了含三苯胺单元的萘酰亚胺化合物(TNP和TNM). 吸收光谱、稳态及瞬态的荧光光谱证实了该体系不仅存在着Förster-type单线态能量转移, 同时存在着光诱导电荷转移(PIET), 正是由于PIET导致目标化合物TNP和TNM的荧光发生严重淬灭, 其淬灭超过99%. 通过加入酸将三苯胺中心氮原子进行质子化, 切断其PIET过程, 可实现荧光的淬灭与恢复的可逆性荧光调控. 该体系的荧光切断与恢复的过程可用于荧光开关的设计.

关键词 [三苯胺](#) [萘酰亚胺](#) [荧光淬灭](#) [荧光调控](#)

分类号

Synthesis and Luminescence-tuning of Naphthalimide- triphenylamine Dyad

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Abstract A series of naphthalimide derivatives (TNP and TNM) were synthesized by incorporating a triphenylamine unit (TPA) into the chromophore of 1,8-naphthalimide. Their steady-state absorption, fluorescence and transient fluorescence were investigated, indicating that there exist efficient Förster-type singlet energy transfer and photo-induced electron transfer (PIET). As a consequence, the fluorescence of TNP and TNM was quenched distinctly, which is mainly arisen from the intramolecular PIET process between the units of TPA and naphthalimide. The fluorescent tuning on and off can be achieved by the stimuli of acid, which will protonate the central nitrogen atom of triphenylamine unit to stop the PIET process. The mechanism can be utilized as the design of fluorescent switching based on the process of fluorescent quenching and recovering.

Key words [triphenylamine](#) [naphthalimide](#) [fluorescent quenching](#) [luminescence tuning](#)

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