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Morphology directing synthesis of 1-aminopyrene microstructures and its super quenching effect towards nitro aromatics

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Abstract: Morphologically interesting microstructures of 1-aminopyrene (1-PyNH₂) are synthesized using re-precipitation method. Two and three dimensional microparticles are obtained in presence of cetyl trimethyl ammonium bromide (CTAB) as morphology directing agent. One dimensional wire shaped microparticles are obtained in the absence of CTAB. Morphologies of the particles change from square to cuboids with increasing concentration of 1-PyNH₂ for a fixed concentration of CTAB (0.5mM). Morphologies of the microparticles have been characterized using optical and scanning electron microscope. Photophysical properties of the particles are studied using UV-Vis, steady state fluorescence and time resolved fluorescence techniques. Computation of Fukui parameter as local reactivity descriptors suggests that the neighboring 1-PyNH₂ molecules are present in face to face slipped conformation in the aggregated structures. The fluorescence properties of aggregated 1-aminopyrene have been utilized for the selective detection of picric acid (PA) by turn off fluorescence intensity and this emission quenching is explained due to ground state complexation with a high quenching constant value, $5.04 \times 10^8 \text{ M}^{-1}$.

Keywords: 1-AminoPyrene; hydrosol; Microstructures; Fluorescence; Static quenching.

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