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Fluorescence quenching of environmentally benign highly fluorescence donor (D)-pi-acceptor (A)-pi-donor (D) quinoline dye by silver nanoparticles and anionic surfactant in liquid stage

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Abstract

2-Amino - 4 - [4 - (dimethylamino) phenyl] - 8 - methoxy-5, 6 - dihydrobenzo [h] quinoline-3-carbonitrile (ADIC) was prepared by multicomponent one-pot reactions (MCRs) of 6-methoxy-1,2,3,4-tetrahydronaphthalin-1-one, ammonium acetate, n, n, dimethyl benzaldehyde and malononitrile under microwave irradiation. Results obtained from spectroscopic (FT-IR, H-1 NMR, C-13 NMR, EI-MS) and elemental analysis. The interaction of colloidal silver nanoparticles (AgNPs) with a blue emitting (ADIC) dye was studied in ethanol and ethylene glycol using steady state fluorescence quenching measurements. The Stern-Volmer quenching rate constant (K_{sv}) was calculated as 7.47 x 10⁽⁷⁾ M⁻¹ and 1.71 x 10⁽⁸⁾ M⁻¹ in ethanol and ethylene glycol, respectively. Surfactant SDS also used as quencher for the ADIC to determine the critical micelle concentration (CMC) of SDS with dye. From fluorescence quenching data, static quenching and energy transfer play a major role in the fluorescence quenching of ADIC by AgNPs and SDS. (C) 2016 Elsevier B.V. All rights reserved.

Keywords

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