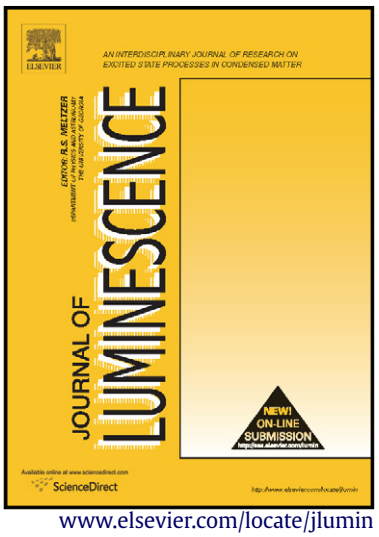

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PII: S0022-2313(14)00463-3
DOI: http://dx.doi.org/10.1016/j.jlumin.2014.08.027
Reference: LUMIN12840

To appear in: *Journal of Luminescence*

Received date: 8 January 2014
Revised date: 31 July 2014
Accepted date: 12 August 2014

Cite this article as: Murat Acar, Ebru Bozkurt, Kadem Meral, Mustafa Arık, Yavuz Onganer, The fluorescence quenching mechanism of coumarin 120 with CdS nanoparticles in aqueous suspension, *Journal of Luminescence,* http://dx.doi.org/10.1016/j.jlumin.2014.08.027

The fluorescence quenching mechanism of coumarin 120 with CdS nanoparticles in aqueous suspension

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Abstract

The interaction of coumarin 120 (C120) with CdS nanoparticles (CdS NPs) in aqueous suspension was examined by using UV-Vis absorption, steady-state, time-resolved fluorescence, and electron paramagnetic resonance (EPR) spectroscopy techniques. The fluorescence intensity of C120 was quenched with increasing the amount of CdS NPs in the aqueous suspension. The spectroscopic data revealed that the C120 molecules adsorbed on CdS NPs via electrostatic interactions. The apparent association constant (K_{app}) and the degree of association (α) for C120/CdS NPs were determined as 130.3M^{-1} and 0.51 for 4nm CdS NPs and 624.3M^{-1} and 0.71 for 8nm CdS NPs, respectively. The photoinduced EPR studies exhibited that no electron transfers between CdS and C120 taking place. The results revealed that the fluorescence quenching of C120 with different CdS NPs is due to the formation of a non-fluorescent complex.

Keywords: Coumarin 120; CdS nanoparticles; Fluorescence quenching; Time-resolved fluorescence.