

Accepted Manuscript

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PII: S0021-9797(17)30365-X
DOI: <http://dx.doi.org/10.1016/j.jcis.2017.03.097>
Reference: YJCIS 22194

To appear in: *Journal of Colloid and Interface Science*

Received Date: 13 February 2017
Revised Date: 22 March 2017
Accepted Date: 22 March 2017

Please cite this article as: S. Mallick, A.S. Arathi, A.L. Koner, Customized Tuning of Aggregation-Induced Emission of a Naphthalimide Dye by Surfactants and Cyclodextrin, *Journal of Colloid and Interface Science* (2017), doi: <http://dx.doi.org/10.1016/j.jcis.2017.03.097>

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Customized Tuning of Aggregation-Induced Emission of a Naphthalimide Dye by Surfactants and Cyclodextrin

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ABSTRACT: The aggregation-induced emission behaviour of an environment sensitive 2,3-substituted naphthalimide dye has been investigated at neutral pH in presence of three different surfactants *i.e.*, cationic, anionic, and neutral. The changes observed in the excitation spectrum of the dye compared to its absorption spectra in water in presence of the surfactants above their micellar concentration reveals the transformation of the H-aggregates of the dye to the monomeric form. The alteration of the dye aggregates to its monomeric form and its consequence on emission properties has been utilized to estimate the surfactant concentration parameter for pre-micellar to micellar transformation. The aggregation of the dye molecules has been made reversible by removal of the surfactant molecules from the system upon host-guest complexation with α -cyclodextrin. This switchable aggregation-deaggregation phenomenon of DMN-Bu by employing surfactants and α -cyclodextrin at neutral pH in water is utilized for determining their critical micellar concentration.

KEYWORDS: Aggregation-induced emission, Naphthalimide Dye, Surfactants, Critical Micelle Concentration, Cyclodextrin

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