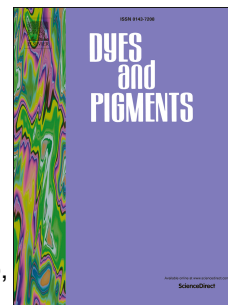


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New organic conjugated dye nano-aggregates exhibiting naked-eye fluorescence color switching

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Abstract

In this study, a variety of new conjugated containing strong electron-donating groups were prepared for formation of organic nano-scale aggregates. The properties and aggregation modes of these aggregates were investigated on basis of time dependent absorption, fluorescence emission spectra as well as scanning electron microscope images. The results show that nano organic aggregates could be yielded by the linear dyes in mixed DMF/H₂O solvent through a simple re-precipitation method, while no aggregates of the branched dyes were produced. X-ray diffraction of single crystal and X-ray diffraction patterns of the powders results demonstrate that the linear dyes tend to show ordered molecular arrangements, while the armed dyes do not exhibit such a tendency. A remarkable fluorescence switching process under 365 nm lamp was observed for the target aggregates. This study successfully provides real examples of organic aggregates in mixed DMF/H₂O solvent which have great capacity to show enhanced fluorescence color switching.

Key words: Conjugated dye; Organic nano aggregate; Fluorescence color switching; Proton transfer

1. Introduction

In recent decades, organic fluorescent materials have been attracting intensive interests since they are applied in many fields such as emitting diodes, optical sensors, tagging applications and cell imaging *etc* [1-3]. In particular, they are more economy and more convenient modification as well as more environmental-friendly for use compared to inorganic and metal species.

However, traditional fluorescent dyes of large delocalized π -conjugated moieties typically suffer from fluorescence quenching at high concentrations or in solid state. Generally, such serious

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