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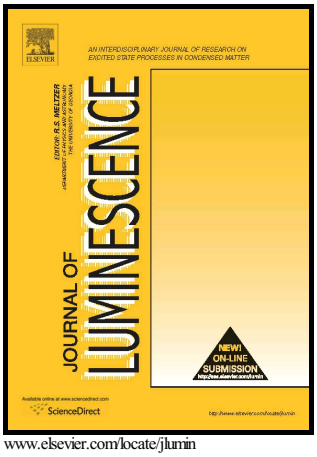

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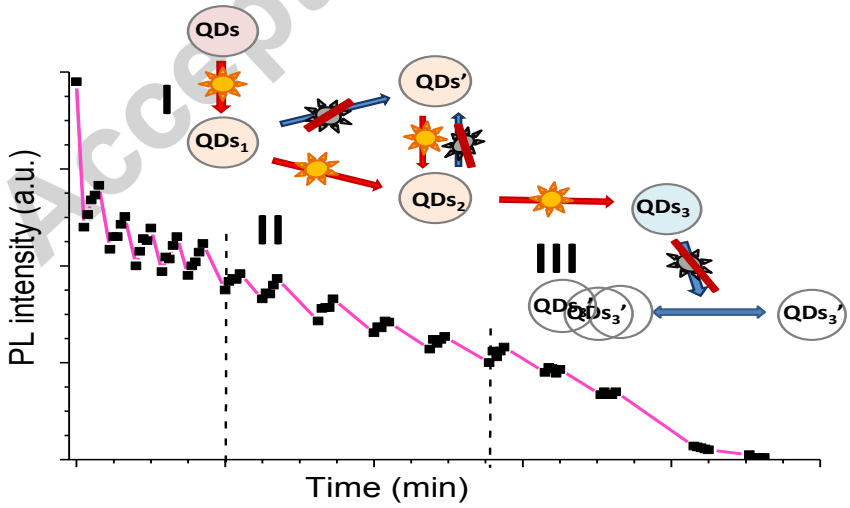
Abstract

The photobleaching of capped CdTe quantum dots (QDs) possessing a photoluminescence (PL) emission band in green or orange spectral regions (550 nm or 570 nm, respectively) was investigated in aqueous solution under irradiation with violet light. The exposure of QDs had a dose-dependent effect on the photoluminescence intensity revealing three main stages in the variable pattern of its decline. The relatively rapid decrease of PL intensity being observed after the initial doses of exposure was followed by its partial recovery in the dark. The decrease was slower during the middle stage, but become faster again under exposure to the highest cumulative doses. The stages detected in the photoluminescence decrease pattern were also distinguished by monitoring the capacity to recover the reduced PL intensity of QDs and observing the changes in PL spectra as well as absorption spectra. The gradual pattern of the photoluminescence changes is assumed to be a reflection of the photoinduced modification and disintegration of a capping layer of QDs.

Graphical Abstract:



Keywords

Quantum dots, capping layer, photoluminescence, photostability, photomodification