

Investigation and analysis of photoirradiation effects on bio-compatible semiconductor nanocrystals systems using spectroscopic techniques

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Great efforts are currently devoted to fabricate high-quality quantum dots (QDs) in aqueous solutions for biomedical applications. Here, two biocompatible systems consisting of core (CdSe) and core/shell (CdSe/ZnS) QDs surface modified with glutathione (GSH), named CdSe-GSH and CdSe/ZnS-GSH respectively, were built. Upon photoirradiation using low laser power, both systems in HEPES (pH 7.2) showed significant photoluminescence enhancements. CdSe/ZnS-GSH showed much less blue shifts in excitonic absorption and emission peaks without photobleaching compared with CdSe-GSH QDs system. X-ray diffraction results for CdSe/ZnS-GSH QDs system suggest no new patterns are formed that could be assigned to a release of toxic by-products following irradiation. This study demonstrates that CdSe/ZnS-GSH QDs system exhibits a high photostability with relatively high luminescence efficiency in aqueous medium making this system attractive for several biomedical applications. An analysis to the effects of low laser power on our system was proposed.

Biography

Tareq Youssef has completed his Ph.D. at the age 32 from Institute of Biophysics-Pisa/Italy and postdoctoral at the same Institute and Ecole Normale Supérieure-Paris/France. Now he is the head of Department of Metrology, Photochemistry and Photobiology at National Institute of Laser Enhanced Sciences, Cairo University He is a reviewer for some journals and published more than 20 international papers. He is involved in local and international projects with Italy, France and Germany.

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