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Effects of manganese doped CdS and ZnS QDs in bacterial growth

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Quantum dots (QDs) are considered as one of the first nanotechnologies to be turned in the biological sciences. With a typical small size of 2 to 10nm, they display some unique characteristics such as wide and continuous absorption spectra, narrow emission spectra, and high light stability. They also exhibit a broad application such as solar cells, transistors, LEDs, medical imaging and quantum computing. In this study, the synthesized QDs of CdS, Mn-CdS, ZnS and Mn-ZnS were synthesized in oxygen and water free nitrogen environment using schlenk line to avoid any oxidation of these QDs during synthesis and to achieve good monodispersity. The core of these QDs surrounded by hydrophobic sidechains (e.g. oleic acid, oleylamine, etc.), which makes them colloidally stable in organic media. These hydrophobic QDs transferred to aqueous phase by polymer coating with an amphiphilic polymer, i.e., poly(isobutylene-alt-maleic anhydride) (Mw= 6000 Da), which makes them soluble in water or buffers for a variety of application in biotechnology, environment etc. The QDs were also characterized in two solvents, water and carbonate buffer in addition to toluene. Their potential toxicity was tested on two *Escherichia coli* (*E. coli*) (potential pathogenic strain) and *Pseudomonas putida* (*P. putida* soil strain). We obtained QD sizes in water by transmission electronic microscopy (TEM)/dynamic light scattering (DLS) in diameter (nm): CdS (4.68±1.40)/(5.79±0.54), Mn-CdS (2.87±0.80)/(2.98±0.41), ZnS (2.40± 0.64)/(2.48±0.08) and Mn-ZnS (2.78±0.68)/(26.78±3.07). The potential toxicity of QDs was tested in different buffer solutions at different time points. It is recommended the QDs should test on another micro (organisms) based on targeted applications.

Biography

Atif Masood affiliated as a PhD scholar, with the Professor Dr Parak's AG Biophotonik group in the Faculty of Physics since October 2014. Professor Parak's research group is a renowned research group in the field of Nanobiotechnology. His PhD research mainly focuses on synthesis, development, stabilization, reliability, and integrity of different types of nanoparticles; the purposeful functional characteristics of the physicochemical properties of the nanoparticles; and the efficient applications of these nanoparticles in the field of oncology to trace the imaging.

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