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### Synthesis of low toxic quantum dots for bioapplications

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The application of semiconductor nanoparticles, or quantum dots (QDs), in the biological context has received a great deal of attention over the last decade due to their unique optical properties, including narrow emission peaks which are tunable through the visible and near-infrared wavelengths, wide absorption bands, large molar extinction coefficients and high photo stabilities. However, there are some serious restrictions to bio applications of QDs such as toxicity, water solubility, biodegradation and photostability of the QDs in biological environments. This work reports cytotoxicity studies of CdSe(S), ZnSe(S) and CdSe(S)/ZnO QDs in the presence of two cell lines: human carcinoma cells (HCT-116) and human skin fibroblast cell line (WS1). The XRD results indicated that cubic phase nanocrystals were obtained in all synthesizes images revealed that all QDs were spherical nanoparticles and optical spectroscopy showed that they had narrow emission and wide absorption bands. The cytotoxicity data showed that cytotoxicity of QDs is dose-dependent and aqueous-synthesized QDs exhibit lower toxicity than organic-synthesized QDs. The results of cytotoxicity assays showed that the cells had 100% proliferation after 72h incubation with ZnSe(S) QDs, at all concentrations used in this study, whilst CdSe(S) QDs exhibit low toxicity at concentrations up to 105µg/ml. This indicates that cadmium is source of toxicity due to production of free radicals. Confocal microscopy showed that all cells nuclei were stable after incubation with QDs and there was no shift or change in emission wavelength of the obtained QDs in cell media, indicating that the obtained QDs are stable in biological environment.

### Biography

Fatemeh Mir Najafi Zadeh has completed her PhD in 2015 from University of New South Wales, Australia. She is currently a Research Assistant in her previous research group in the Department of Chemistry at University of New South Wales. She has published several papers in peer-reviewed journals and has attended more than 14 international conferences as speaker or poster presenter.

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