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Gelatin stabilization of quantum dots for improved stability and biocompatibility

Samuel Oluwatobi Oluwafemi
University of Johannesburg, South Africa

We herein report an aqueous synthesis of gelatin stabilized CdTe/CdS/ZnS (CSSG) core/double shell quantum dots (QDs) with improved biocompatibility. The as-synthesized QDs were characterized by ultraviolet-visible (UV-Vis) and photoluminescence (PL) spectroscopic techniques, X-ray diffraction technique (XRD), X-ray photoelectron spectroscopy (XPS) and transmission electron microscopy (TEM). The CSSG QDs revealed high photoluminescence quantum yield (PLQY) with excellent stability over a period of one year and retained 90% of its initial PLQY without any aggregation or precipitation under ambient condition. The cell viability study conducted on HeLa, cervical cancer cell lines indicated that the gelatin stabilization effectively decreased the QDs cytotoxicity by about 50%. The CSSG QDs were conjugated with transferrin (Tf) for the efficient delivery to the cancer cells followed by fluorescence imaging. The results showed that the CSSG QDs illuminates the entire cell which renders the QDs as cell labeling markers. The gelatin stabilized core/double shell QDs are potential candidates for long time fluorescent bio-imaging.

Biography

Samuel Oluwatobi Oluwafemi is a National Research Foundation (NRF), South Africa rated Researcher at the Department of Applied Chemistry, University of Johannesburg, South Africa. His research is in the broad area of nanotechnology and include green synthesis of semiconductor and metal nanomaterials for different applications which include biological (imaging, labeling, therapeutic-PDT and PTT), optical, environmental and water treatment. He has author and co-author many journal publications, book chapter and books. He is a Reviewer for many international journals in the field of nanotechnology and has won many accolades both local and international.

oluwafemi.oluwatobi@gmail.com

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