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A facile synthesis of pH and light sensitive dual capped CdTe QDs and their potential theranostics application

Daramola Abiodun Olamide Rhodes University, South Africa

S emiconductor nanoparticles also known as quantum dots (QDS), are examples of diagnosis materials used together with a model drug for various theranostics applications. One of the widely synthesized QDs used in cancer therapy is thiol capped CdTe nanoparticles. The combination of their good optical and photo physical properties makes them useful in bio-medical application such as drug delivery and bio sensing. However, the major problem attributed to the synthesis of this material is the source of tellurium. The use of tellurium powder and H₂Te gas are either unstable or highly poisonous. Recent studies have confirmed sodium and potassium tellurite as a stable source of tellurium without the protection of inert atmosphere. Presently, we have been able to synthesize five different types of thiol dual capped CdTe QDs using a one pot synthetic method without the protection of nitrogen atmosphere. The photo-physical evaluation of the dual capped QDs demonstrated high intensities with long term stability as compared to single capped CdTe QDs. Results from the structural characterization confirms the capping of thiol ligands and the formation of spherical shaped nanoparticles. The use of citrate and phosphate buffers confirms the pH sensitivity of the QDs with QD 3 and 4 demonstrating some pH responsiveness. The titration experiment conducted using 0.1 M dilute HCL and deionized water further confirms their pH sensitivity which suggest their potential application in cancer diagnosis. We therefore report a facile synthesis of dual capped CdTe QDs for future use in the field of nano-medicine.

Biography

Daramola Abiodun Olamide has completed his Master's degree in Nanotechnology from Walter Sisulu University South Africa. He is currently a PhD student at Rhodes University where his researched is focused on the synthesis of smart scale nanoparticles drug delivery application. He has published some papers in reputable journals one of which is facile synthesis of glutathione-L-Cysteine co-capped CdTe core shell system with a study on optical and structural morphology (2017). He has also been previously awarded the Best Oral Presenter in the 2015 Post graduate seminar organized by the South African Chemical Institute and a top-rated Post graduated Researcher.

truelamm@gmail.com

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