

7th World Nano Conference

June 20-21, 2016 Cape Town, South Africa

Aqueous Synthesis of Copper Sulfide Nanoparticles for Biological Applications

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Innovation in the field of nanotechnology has shown potential to unlock key advances in the detection, diagnosis, treatment and management of infectious diseases. Nanotechnology has pioneered the miniaturization of structures and materials to a nanometre scale, forming nanostructures that are suitable to explore biological processes. Amongst nanomaterials, quantum dots (QDs) are gaining popularity in biological applications. Quantum dots have been applied in biological assays as fluorescent probes for disease diagnosis *in vitro* and imaging replacing conventional fluorophores (organic dyes and fluorescent proteins) thereby improving assay sensitivity. Amongst these QDs, Copper Sulfide (Cu₂S) nanoparticles have been the most widely used nanomaterial since they are non-toxic, inexpensive and stable under ambient conditions. Herein, we report the synthesis of glutathione (GSH) capped copper sulfide quantum dots for use in biological applications. Biocompatible copper sulfide nanoparticles of different shapes and sizes were synthesised in aqueous media using a one pot hydrothermal synthesis route. These nanoparticles were found to be less toxic when tested on mammalian cells in the MTS assay, and therefore qualify for use as targeting agents in biological assays.

Biography

Phumlani works as a research scientist in the DST/Mintek Nanotechnology Innovation Centre (DST/Mintek NIC), at Mintek. He holds an MSc degree in Physiology and is currently registered for a PhD degree in Chemistry and Nanosciences at the University of Witwatersrand.

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