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## Metal and semiconductor nanoparticles and their polymer fibres

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Quantum dots (QDs) are semiconductor nano-particles, which have many unique properties and show interesting phenomena, such as size dependent emission wavelength, narrow emission peak and broad excitation range. QDs have been studied for almost three decades and are nano-crystals in which excitons are confined in all three spatial dimensions. The confinement can be realized by fabricating the semiconductor in very small size, typically several hundred to thousands of atoms per particle. Due to quantum confinement effects, QDs act like artificial atoms, showing controllable discrete energy levels. QDs were first fabricated in the 80's by Louis E. Brus and the unique properties of these special nano-structures attracted interest from many fields. CdSe is a binary semiconducting material of cadmium and selenium. CdSe is being developed in research for use in opto-electronic devices, nanosensing, and biomedical imaging. This presentation will be focused on CdSe and other metal based chalcogenides such as AgSe, CuSe and Ag. Various methods have been explored in making metal chalcogenide nanoparticles and for example, CdSe nanoparticles are prepared using a solution of cadmium and selenide under controlled conditions. The incorporation of nanoparticles prepared into the polymer PMMA using electrospinning technique in order to make polymer fibre. Variation of percentages of CdSe nanoparticles into the polymer cause coiling of fibres and decreased luminescence intensity. CdSe nanoparticles were also used as core in the synthesis of CdSe/ZnO and CdSe/PbS nanomaterials using thioglycerol, hexadecylamine and trioctylphosphine oxide. The semiconducting, metal nanoparticles and polymer fibres will be discussed for their synthesis and characterization; their properties will be explored from their synthetic conditions.

### Speaker Biography

Makwena Justice Moloto has completed his PhD at the age of 30 years from the University of Zululand and spends time at the University of Manchester to complete his PhD hosted by school of chemistry. He is the researcher at one of the technically orientated university in the department of chemistry. He has published more than 40 papers in reputed journals and has been serving as a reviewer for a number of materials chemistry journals of repute.

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