FUNGUS AS THE POSSIBLE NANOFACTORIES OF CDS QUANTUM DOTS

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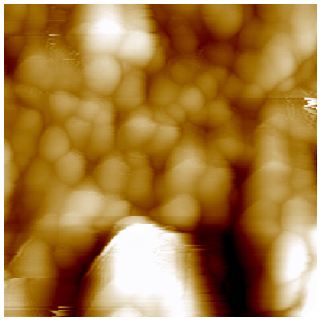

The development of reliable, eco-friendly processes for the synthesis of nanomaterials is an important aspect of nanotechnology today. The use of biological organisms in this area is rapidly gaining importance due to its growing success and ease of formation of nanoparticles. The shift from bacteria to fungi as a means of developing natural 'nano-factories' has the added advantage that downstream processing and handling of the biomass would be much simpler. The use of white rot fungi in the synthesis of nanoparticles is a relatively recent addition to the list of microorganisms. The use of fungi is potentially exciting since they secrete large amounts of enzymes and are simpler to deal with in the laboratory. That they secrete enzymes when challenged, which are capable of metal-ion reduction and indeed conversion of sulphates to sulphides, suggests evolutionary processes are at play.

The present paper describes an optimized "green" route to simultaneously bioremediate Cadmium and to transform it into CdS quantum dots at room temperature in continuous columns immobilized with fungus. As a typical semiconductor material of the II–VI group, cadmium sulfide (CdS) nanocrystals with a direct band gap of 2.4 eV at room temperature, has been the subject of intense interest because of its unique properties and potential applications in solar cells, laser light-emitting diodes and photoelectric devices. CdS, one of the most attractive metal chalcogenides, has been widely used as biomarkers owing to its excellent optical properties.

This is a safe, low cost and more convenient approach as it does not involve special instrumentation, poisonous intermediates and the growing-rate can be easily controlled. The CdS nanoparticles obtained were characterized by XRD, FTIR, TGA, SEM, AFM, UV–vis and photoluminescence (PL) spectra.