Synthesis and Characterization of Manganese Desert Rose Nanoparticles: A Fourth Year Study

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Nanoparticles are of significance because of their small size and unique characteristics. Few studies have been conducted on the synthesis of manganese nanoparticles. This project was among the first to synthesize manganese nanoparticles, and this was done using a microfluidic device with manganese acetate as an ion source and sodium dithionite as a source of oxide. Various capping ligands were used, including FusionRed protein, green fluorescent protein (GFP), bovine serum albumin (BSA), and casein. As different capping ligands were used for the manganese nanoparticles, different shapes and sizes of particles formed. Fluorescence spectroscopy and scanning electron microscopy were used to confirm that the particles synthesized were in the nanoscale size range. FusionRed was used as a capping ligand, desert rose nanoparticles formed. These nanoparticles were found to be conductive. In my investigations, it was noted that when water sources used for solutions were changed, the desert rose nanoparticles stopped forming. This implies that the desert rose nanoparticle fabrication process is highly sensitive to one or more trace contaminant in the water (all water sources were deionized), and this is currently being investigated. The desert rose nanoparticle formation is also highly sensitive to other variations in the synthesis. When pH and flow rate of solution were varied, the shape of the nanoparticles changed.

Awards Won:
Third Award of $1,000