INTEGRATED APPROACH FOR THE FABRICATION OF MULTIFUNCTIONAL METAL AND METAL OXIDE NANOPARTICLES: PARTICLES, POLYMERS AND POTENTIAL

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Over the past decade there has been extended interest in the use of magnetic nanoparticles for both imaging and therapeutic applications in medicine, as well as assessing the environmental impact of metal oxides. Key to the success of these opportunities is the preparation of well-characterized materials with tailored magnetic, thermal, colloidal, and bio-interaction properties. To address these issues we have focused our efforts on three distinct areas in this problem: 1.) Nanoparticle synthesis and morphology, 2.) Surface-ligand interfaces, and 3.) Specialized surface moieties for additional imaging, therapy, and targeting. This talk will describe new developments in nanoparticle synthesis via the extended LaMer mechanism for growth, radioanalytical techniques to quantify the surface functionality, and the addition of functional groups for therapeutic applications. These include the creation of alternatives for antibiotics, multimodal MRI contrast agents, drug delivery for the treatment of hyperplasia, and detection of markers for Alzheimer's and diabetes.

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