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Nano-sized Fe-Metal Catalyst on TiO_2-SiO_2: (Photo-assisted Deposition and Impregnation) Synthesis Routes and Nanostructure Characterization

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The photo-assisted deposition and impregnation (Img) synthesis of nano-sized Fe metal on TiO_2-SiO_2 are reported. The prepared catalystswere characterized by different techniques such as XRD, XAFS, TEM and nitrogen adsorption analysis. Photocatalytic reactivity usingFe-TiO_2-SiO_2 catalysts under visible-light condition on the reduction of Hg^{2+} to Hg^0 were evaluated. The results have shown notablephotocatalytic activity of PAD-Fe/TiO_2-SiO_2 which was 2 and 10 times higher than that of Img-Fe/TiO_2-SiO_2 and TiO_2-SiO_2, respectively

Biography

Elham Aazam has completed her Ph.D. from Sussex University, UK and is an associate professor at King Abdulaziz University at the Science College and chemistry department. She is the head of the Chemistry department at the female section; she has published 25 papers in reputed journals.

Dual targeted and dual drug loaded magnetic nanoformulation as theragnostic agent and evaluation of synergistic effect of magnetic hyperthermia and drug-mediated destruction of cancer cells

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Magnetic nanoparticles (MNPs) have emerged as one of the significant futuristic nanomaterial for a variety of biological applications. The next generation MNPs with designer theragnostic functionalities has attracted considerable attention and will greatly improve nanomedicine. Innovations in cancer nanotechnology has up surged the use of novel therapeutic strategies such as nanotheranostics that utilize individualized diagnostic therapy. MNPs have been studied as nanocarriers for drugs, contrast-imaging agents in magnetic resonance imaging (MRI), in local hyperthermia, and magnetic targeting. Novel multifunctional MNP formulations possessing ultra-low particle size, high inherent magnetic properties, effective imaging, drug targeting, and drug delivery properties are extremely significant for cancer nanotechnology. To achieve these goals we developed, dual drug (curcumin and 5-FU) loaded PLGA MNP formulation was developed. The engineered structure of our nanoformulation maintains highly efficient targeting feature (folate and transferrin), diagnostic imaging properties for MRI and optical imaging, destruction of cancer cells by the activity of curcumin and 5FU and enhanced killing by hyperthermia, when an external magnetic field was applied. This multifunctional, highly specific nanoconjugate resulted in superior uptake of NPs by cancer cells. Upon magnetic hyperthermia we could harness the advantage of the incorporation of magnetic NPs that synergistically acting with the drugs, destroyed cancer cells within a very short period of time. The remarkable multimodal efficacy attained by this therapeutic nanoformulation offers the potential for targeting, imaging and treatment of the cancer within a short period of time by initiating early and late apoptosis.

Biography

Balasubramanian Sivakumar is presently a Ph.D. candidate in Toyo University, Japan. He has submitted his thesis and graduated in September 2013. His area of specialization is magnetic nanoparticles and the application of the same for efficient targeting, drug delivery, imaging and magnetic hyperthermia in cancer cells. He has published several papers in reputed journals.

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