

Magnetism and biomedical applications of single domain magnetic nanoparticles

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Abstract

Single-domain magnetic nanoparticles (SDMNP) have recently received a considerable interest, due to their important technological applications and their unique physical and chemical properties that differ from the bulk counterpart. It has great potential impacts in several medical applications such as magnetic resonance imaging (MRI) contrast enhancers, drug and gene delivery, biomedicine, biosensors, magnetic nanoparticle hyperthermia, magnetic separation, coating and ferrofluids. Most of these therapeutic and diagnostic applications require magnetic nanoparticles of size smaller than 20 nm with a narrow size distribution, form a stable suspension, be monodisperse, and biocompatible.

The main objectives of this article are to: (1) provide the physical principles and the underlying phenomena related to SDMNP such as super paramagnetism and magnetoresistance; (2) report some controllable synthesis techniques for nearly producing monodisperse suspensions and core-shell that satisfy the criteria of the medical applications; (3) explore the potential impacts of the SDMNP in several biomedical applications as mentioned above.

Biography

M Sultan has completed his PhD at the age of 37 years from Hyderabad University, India. He is the dean deputy assistant professor of IBB University, Yemen. He has over 10 publications that have been cited over 144 times. He has held management positions as a dean of engineering college, Al-Jazeera University and as a Head of Department of Physics, college of Science, IBB University. He has participated in several workshops for developing the quality insurance for Applied Physics and BETEP programs. He has also published 3 books in classical mechanics, electromagnetic theory and Introductory Course in Nanotechnology 2020.



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