

عنوان مقاله:

An Overview of Cobalt Ferrite Core-Shell Nanoparticles for Magnetic Hyperthermia Applications

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خلاصه مقاله:

Cobalt ferrite nanoparticles (CoFe_2O_4) are well known for some distinctive characteristics such as high magnetic permeability and coercive force, good saturation magnetization, excellent physical, and chemical stability, which make them so attractive for magnetic storage, magnetic resonance imaging (MRI), drug delivery, optical-magnetic equipment, radar absorbing materials (RAM), and magnetic hyperthermia applications. According to these particularities, cobalt ferrite-based core-shell nanoparticles have been reviewed focusing on hyperthermia applications. Promoting anisotropic constant and magnetic permeability, increasing the chemical and physical stability of nanoparticles, the proper distribution of particles in aquatic environments to prevent agglomeration, sedimentation, and obstruction in a specific position, as well as enhancing biocompatibility and avoiding the disadvantages, are essential for better efficiency in hyperthermia aspect. For this purpose, the synthesis of magnetic nanoparticles of cobalt ferrite with preferentially smaller sizes, as well as a narrower range of particle size distribution, is the primary objective of the synthesis process. Hence, it is important to identify the influence of effective parameters on the size and shape of nanoparticles, the substitution mechanisms of rare-earth elements, and changing the structure and behavior of the magnetic properties by these elements and finally, the thermal properties. Moreover, surface modifications and coating are other significant parameters in hyperthermia field that are investigated to achieve a suitable and stable distribution in aqueous media, and how they behave against the magnetic field.

کلمات کلیدی:

Hyperthermia, Cobalt ferrite, Rare-earth Elements, Surface modification

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