INCREASE OF MAGNETIC HYPERTHERMIA EFFICIENCY DUE TO THE OPTIMAL SIZE OF PARTICLES IN FE3O4 NANOPARTICLES: THEORETICAL AND EXPERIMENTAL RESULTS.

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Abstract:

In this study, the Fe3O4 nanoparticles with particle size from 5 to 20 nm were synthesized using the thermal decomposition method. Magnetic hyperthermia measurements on these nanoparticles show moderate values of the specific absorption rates (SAR) in applied AC magnetic fields of amplitude 200 Oe and frequencies of 450 kHz. The highest value of SAR is 123.31 W/g for 20 nm Fe3O4 MNPs. The theoretical results within the framework of the linear response theory were used for comparing with experimental ones. The value of SAR obtained through magnetothermal measurements is found to be in excellent agreement with that obtained using the linear response theory. These results open the path to a more accurate prediction for the synthesis of the magnetic fluids for applications in magnetic hyperthermia.