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COVER ILLUSTRATION In the recent years, ferromagnetic nanoparticles that are able to heat under an alternating magnetic field have been of considerable interest in the field of nanotechnology. Special attention is being paid to the study of compounds with a spinel Fe_3O_4 and perovskite $(LaSr)MnO_3$ structure that can be used as hyperthermia inductors for cancer treatment. For practical use, such nanoparticles should be crystalline, not agglomerated, biocompatible and demonstrate both superparamagnetic properties and high heating efficiency. Ferromagnetic Fe_3O_4 and $(LaSr)MnO_3$ nanoparticles with desired properties can be synthesized by the use of cryochemical and sol-gel technologies. For in vitro studies, the stable magnetic fluids based on synthesized nanoparticles and aqueous agarose solution can be prepared. In the magnetic study, it should be noted that the temperature of the magnetic fluid based on Fe_3O_4 nanoparticles increases linearly to the time of the alternating magnetic field exposing, while for $(La,Sr)MnO_3$-based fluid, it stabilizes within a given temperature range. It was shown that the nanoparticles of $(La,Sr)MnO_3$, unlike Fe_3O_4, are characterized by low toxicity, antioxidant activity and ability to influence the cell-virus interaction on a normal cell line (ST-cell line). The possibility of magnetic fluids obtained in this work to generate heat under the alternating magnetic field exposing as well as the lack of side effects allow to consider them as a potential mean for magnetic hyperthermia.
To learn more about this topic please see the article “Synthesis and comparative characteristics of biological activities of (La,Sr)MnO3 and Fe3O4 Nanoparticles” by Shydlovska et al. on pages 33–43 of this issue.
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