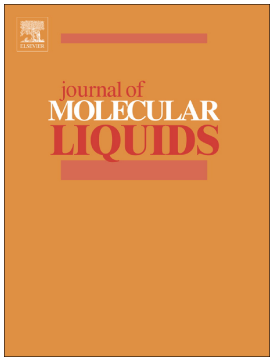

Effect of carriers on heating efficiency of oleic acid-stabilized magnetite nanoparticles

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Effect of carriers on heating efficiency of oleic acid-stabilized magnetite nanoparticles

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Abstract

The most challenging task in hyperthermia is to maximize the specific absorption rate (SAR) with a low dose of a ferrofluid. Magnetite nanoparticles coated with oleic acid (MNPs-OA) was prepared by co-precipitation process in the presence of basic media. The morphology, hydrodynamic size, surface charge and the magnetic phase were characterized using TEM, DLS, zeta potential and XRD, respectively. In addition, the thermal stability, functionality and magnetic properties were analyzed using TGA, FTIR and VSM, respectively. The effects of carriers viscous namely, water and ethanol, and magnetic field strength (1, 0.7, 0.5, 0.3, 0.1 kW) on SAR and of the heating's profile of the prepared nanoparticles are studied. It is obvious that, the SAR values increased with increasing the power of magnetic field and reduced as the carrier viscosity increased. MNPs-OA, with the highest SAR value (214.95 Wg^{-1}), are promising agents for hyperthermia, as well as for further work toward hyperthermic drug release.

Keywords:

Magnetite; oleic acid; hyperthermia; specific absorption rate