A facile method to syntheses monodisperse gamma-Fe2O3 nanocubes with high magnetic anisotropy density

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Abstract

The performance of iron oxides, as a clinical tool for hyperthermia application, is strongly depending on their size and structural morphology. The precise control of the iron oxide shape and morphology offers a unique strategy to modify the strength of the dipolar interactions between iron oxide nanoparticles through the engineering of the magnetic surface anisotropy density. This article presents a novel recipe to synthesize gamma-Fe2O3 nanocrystals with cubic morphology. The gamma-Fe2O3 nanocubes were prepared through microwave assisted solvothermal technique. The use of 2,3-oxidosqualene results in iron oxide with cubic shape. The gamma-Fe2O3 nanocubes were analyzed by X-ray diffractometer (XRD), transmission electron microscopy (TEM) and electron diffraction (SAED). The magnetic analysis revealed that the gamma-Fe2O3 nanocubes have a saturation magnetization of 62 emu/g and magnetic surface anisotropy density K-eff =2 x 10(5) erg/cm(3) compared to bulk iron oxide. (C) 2014 Elsevier Ltd. All rights reserved.

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