

Evolution of Monodisperse Magnetite Hollow Spheres through Solvothermal Process for Medical Applications

Nguyen The Dung, 이용석, 김교선*
강원대학교 화학공학과
(kkyoseon@kangwon.ac.kr*)

We prepared monodisperse Fe₃O₄ nanospheres with hollow interior structures and high saturation magnetization of 81.0 emu g⁻¹ through a process using FeCl₃•6H₂O and ammonium acetate as the reactants in an ethylene glycol solution. After 2 h, only brown precipitation was observed with undefined shape. After 4 h, nano spherical particles started to appear from the aggregation of that brown precipitation. For a heating time of 10 h or longer, the obtained samples were composed of uniform nanospheres. The microsphere was then followed by a solid core evacuation, and a hollowing effect is observed for those with a longer reaction time of 12 h. After 24 h, the hollow spheres were well developed. We studied systematically the time-dependent shape evolution by SEM and TEM observations and also by XRD, FT-IR spectroscopy measurements to understand the particle formation mechanism.