

암치료용 광감제가 코팅된 자성유체에 관한 연구
(A study on magnetic fluids coated with photosensitizer for cancer treatment)

충남대학교 재료공학과 박상익, 황육강, 이광성, 김종오
 충남대학교 고기능성자성재료연구센터 김종희

1. Introduction

Magnetic fluids are stable colloidal suspensions composed of monodomain ferrite-based($M \cdot Fe_2O_4$) magnetic nanoparticles dispersed in organic liquid carriers, and magnetic nanoparticles are quickly synthesized through chemical condensation reactions in aqueous medium.

Cancer cells could be destroyed by localization of coated nanoparticles with hematoporphyrin in the application of external magnetic field. The effect of amount of each precipitator on the magnetic fluid was investigated using NH_4OH and $NaOH$. Also, the coating concentration of fabricated nanoparticles with hematoporphyrin was calculated with the optimal amount.

2. Experimental

Considering the dissolution of magnetic nanoparticles, the particle size below around 10nm with single domain is proper. Therefore, the magnetic particles synthesized in nano-size characterize the superpara magnetic property.

Coprecipitation was used for the initial reaction. The solution of $FeCl_2 \cdot 4H_2O$ and $FeCl_3 \cdot 6H_2O$ were used to fabricate magnetite nanoparticles. The NH_4OH and $NaOH$ were used as precipitator, respectively.

12ml of NH_4OH was used for optimal size of nanoparticle and magnetization value. The amount of added hematoporphyrin was 1×10^{-3} mol and the coating concentration calculated by UV-spectrometer.

3. Results

The effect of precipitators were investigated to fabricate the optimized magnetite nanoparticles with superior magnetization value. The size of particle was about 10nm and the magnetization exhibited excellent values up to 60emu/g. When the hematoporphyrin was added with 1×10^{-3} mol, the concentration of coated hematoporphyrin was 2.35×10^{-4} mol/l.