

Influence of Silica Shell on Toxicity of Manganese Perovskite Magnetic Nanoparticles

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Extended Abstract

Attention was paid to the lanthanum manganese perovskites of general formula $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$. Complex magnetic oxides as core materials are interesting because their magnetic properties can be regulated by various ways very well. These magnetic nanoparticles can be interesting for application in biomedicine as a contrast agent for magnetic resonance imaging or as a colloidal mediator for cancer magnetic hyperthermia. Moreover, heating the particles can be managed very well by appropriate setting Curie temperature which can reduce the risk of overheating and damage of surrounding healthy tissue. Tuning the Curie temperature at a value just above the treatment temperature would be the smartest way to control hyperthermia.

Nanoparticles of manganese perovskite were synthesized by sol - gel method (Pollert et al., 2010). Prepared magnetic cores had to be converted into a stable and non toxic suspension to allow their administration either by intratumoural or intravenous way. For this purpose coating by silica shell was chosen, which provides stabilization by electrostatic repulsion. Silica shell was formed by polycondensation reactions of tetraethoxysilane hydrolytic products (Kaman et al., 2009). Thickness of silica shell can influence magnetic cores toxicity and quality of the suspension.

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References

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