

## Encapsulation of superparamagnetic iron oxide nanoparticles with polyaspartamide biopolymer for hyperthermia therapy

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We report a delicate synthesis process of polyaspartamide-encapsulated superparamagnetic iron oxide nanoparticles (PA-SPIONs) with their sufficiently obtained grain-size below 100 nm for hyperthermia application. Iron oxide nanoparticles with a high magnetization have been applied as nano-heaters while PA is a biocompatible and biodegradable polymer with a polysuccinimide (PSI) backbone. Multi-functional polymer PA could be conjugated with other groups such as biotin to enhance the uptake capability by receptors of cancer cells. Consequently, encapsulating SPIONs nano-heaters with PA biopolymer is an attractive roadmap for hyperthermia therapy application. Our results revealed that PA-SPIONs showed excellent biocompatible behavior based on cell viability test. With Prussian blue staining of cancer cells (4T1), cellular uptake of PA-SPIONs was significantly increased in the presence of biotin conjugated on the outer shell. Furthermore, PA-SPIONs exhibited effective cancer killing activities in both *in vitro* and *in vivo* hyperthermia experiments.