Abstract Submitted
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Thermosensitive Nanostructured Media for imaging and Hyperthermia Cancer Treatment[1] KAREN MARTIROSYAN, University of Texas at Brownsville — Hyperthermia has been used for many years to treat a wide variety of tumors in patients. The most commonly applied method of hyperthermia is capacitive heating by using microwave. Magnetic fluids based on iron oxide (Fe3O4), stabilized by biocompatible surfactants are typically used as heating agent. However, significant limitations of using commercial available magnetic particles are non-selectivity and overheating of surrounding normal tissues. To improve the efficacy of hyperthermia treatment we intend to develop Curie temperature (Tc)-tuned nanostructured media having T2 relaxation response on MRI for selective and self-controlled hyperthermia cancer treatment. As an active part of this media we fabricated superparamagnetic, biocompatible and dextran coated ferrite nanoparticles Mg1+xTixFe2(1-x)O4 at 0.3<x<0.5 with low Curie temperature. To tune Tc we produced a large number of ferrites powders with x=0.05 by aqueous combustion synthesis. This process typically involves a reaction in a solution containing metal nitrates and different fuels, which are classified based on the type of reactive groups (e.g., amino, hydroxyl, carboxyl) connected to a hydrocarbon chain, such as glycine, hydrazine, or urea. Our experiments revealed that ferrite with formula Mg1.35Ti0.35Fe1.3O4 appears with Curie temperature within 46-50 $^{\circ}$ C.

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Karen Martirosyan
University of Texas at Brownsville

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