Abstract Submitted
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Investigation of smart magnetic nanoparticles for the use in magnetic-field-induced hyperthermia treatment of cancer[1] MEGAN ALLYN, Kettering University, PARASHU RAM KHAREL, South Dakota State University, PREM VAISHNAVA, RONALD TACKETT, Kettering University — The use of aqueous suspensions of magnetic nanoparticles, or ferrofluids, in the magnetic-field-induced hyperthermia (MFH) treatment of cancer has emerged as a possible low-side-effect alternative to standard chemo- and radiotherapy-based treatments. Typically, superparamagnetic iron oxide nanoparticles (SPIONs) are used for their relative biocompatibility; however, their high Curie temperatures (T_C ¿ 500 °C) require external temperature monitoring as the fluids can easily heat to temperatures well above the desired 40 °C 60 °C therapeutic window. To combat this problem, we propose the use of strontium-doped lanthanum manganate nanoparticles, $La_{1-x}Sr_xMnO_3$. These materials allow for the tuning, through strontium doping, of the Curie temperature within the desired therapeutic range. The synthesis and characterization of these nanoparticles by x-ray diffraction (XRD), energy dispersive spectroscopy (EDS), transmission electron microscopy (TEM), vibrating sample magnetometry (VSM), and magnetic calorimetry will be presented.

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