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The investigation of smart magnetic nanoparticles for use in the hyperthermia treatment of cancer MEGAN ALLYN, Kettering University, PARASHU KHAREL, South Dakota State University, PREM VAISHNAVA, RONALD TACKETT, Kettering University — The magnetic fluid hyperthermia (MFH) treatment of cancer has emerged as a possible low-side-effect alternative to traditional chemotherapy- and radiation-based therapy. As the nanoparticles absorb energy from a low amplitude RF magnetic field they heat up; however, currently used hyperthermia systems require external temperature monitoring as the nanoparticles can easily heat to temperature greater than the desired window between 42C and 46C. To combat this, we are investigating smart magnetic nanoparticles whose Curie temperatures fall within the desired range. In order to do this, we have doped non-magnetic cations onto the structure of the AFM LaMnO3. We report synthesis of LaxM1-xMnO3 (M = Ba, Ca, Sr; x = 0.10 0.25) nanoparticles via sol-gel method for use in temperature-controlled MFH. These nanoparticles were characterized via powder x-ray diffraction and found to have the expected R -3 c perovskite structure. For elemental analysis, energy dispersive spectroscopy was performed using scanning electron microscopy. The temperature dependence of the magnetization was investigated using vibrating sample magnetometry (VSM) to determine the Curie temperature of the ensembles. The results of the change in temperature vs time and SAR values will be presented.

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