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Induction heating and controlled drug release from thermosensitive magnetic microgels R. REGMI, S.R. BHATTARAI, C. SUDAKAR, A.S. WANI, Wayne State University, R. CUNNINGHUM, P.P. VAISHNAVA, Kettering University, R. NAIK, D. OUPICKY, G. LAWES, Wayne State University — Poly-N-isopropyl acrylamide (PNIPAM) is a biocompatible thermosensitive polymer that exhibits reversible volume phase transition from a hydrophilic coil to hydrophobic globule at the lower critical solution temperature (LCST) of 32 °C. To stimulate conformational change we introduced magnetite nanoparticles (size ∼12 nm) in the PNIPAM matrix. The PNIPAM/magnetite nanoparticles composite was then exposed to an alternating magnetic field at a frequency of 380 kHz to induce heating in the nanoparticles by Neel and Brownian relaxations. We report *in vitro* controlled release of anti-cancer drug mitoxantrone which was loaded into PNIPAM/magnetite nanoparticles composite, driven solely by the heating induced by the external magnetic field. We found that the drug released reached 4% in only 4 minutes of heating to 50 °C. We also present results on dielectric and magnetic anomalies near the LCST of the PNIPAM-Fe_3O_4 composite.

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