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Enhanced RF Heating of Poly(N-Isopropylacrylamide) Gels by Utilization of Multiferroic Nanoparticles EZEKIEL WALKER, University of North Texas, YUKIKUNI AKISHIGE, Shimane University, JAMES ROBERST, TONG CAI, ZHIBING HU, ARUP NEOGI, University of North Texas — Poly(N-Isoproylacrylamide) polymer hydrogels possess the special property of a discontinuous volumetric phase transition. This phase transition can be induced by external stimuli such as temperature, light, electric or magnetic fields, PH, and others. Of great interest is the functionalization of the gels to external stimuli for faster and more uniform spatial response. An efficient route to functionalization, specifically for termperature and light, is to utilize nanoparticles with EM resonances in the polymer network. The nanoparticles would be distributed throughout the gels, and an EM source resonant with the nanoparticle-gel structure would be used to induce a hysteresis-like effect to heat the gels, thereby, electromagnetically controlling the phase of the gel. KF-$BaTiO_3$ and $BiFeO_3$ are two sets of promising multiferroic nanoparticles that have exhibited resonances in the GHz region. Here, we present our findings for the functionalization and enhancement of the gels for radio-frequency light using KF-$BaTiO_3$ and $BiFeO_3$.

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