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**Characteristics of oscillating magnetic field-actuated microvalve response time** JONATHAN KESSLER, SANTANEEL GHOSH, JIAN PENG, SE Missouri State University, CLAYTON SCHENK, University of Arkansas — Magnetically responsive thermo-active hydrogels offer several potential advantages over other bio-material systems for the controlled release applications for micro- and nanofluidic devices. Volume phase transition of the thermo-sensitive gels is controlled by the change in entropy of the system induced by the hysteresis loss of embedded ferromagnetic nanoparticles modulated by an ac magnetic field. It has been shown in [1], a poly(N-isopropylacrylamide) (PNIPAM) based thermo-responsive system provides controlled heating and volumetric changes with a significantly faster response time through magnetic actuation owing to its smaller dimension. Moreover, it is extremely easy to modulate the field and frequency. Varying the flow rate, channel diameter, and valve width, we characterize the response time of the microvalve for drug delivery applications. [1] S. Ghosh, C. Yang, T. Cai, Z. Hu, and A. Neogi, *J. Phys. D: Appl. Phys.* **42** (2009) 135501

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