

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Photo-actuating waveguiding fibers based on light responsive hydrogels YING ZHOU, ADAM HAUSER, Univ of Mass - Amherst, NATHAN RASMUSSEN, MARK KUZYK, Washington State University, RYAN HAYWARD, Univ of Mass - Amherst — The combination of light-absorbing nanoparticles with thermally sensitive hydrogels has been widely explored as a strategy for photo-thermal actuation. Here, we employ a system of photo-crosslinkable copolymers containing pendent benzophenone units to prepare planar waveguiding polymethylmethacrylate (PMMA) fibers patterned with poly(N-isopropyl acrylamide) (PNIPAM) copolymer hydrogels containing Au nanoparticles. These structures show both thermally- and photo-actuated bending behavior due to swelling stresses developed in the PNIPAM gel layer. Further, we establish that light can be successfully guided into micro-patterned fibers, yielding a route to remotely controlled micro-actuators.

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Date submitted: 14 Nov 2014

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