

Abstract Submitted
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Mechanically induced oscillations in Belousov-Zhabotinsky gels IRENE CHEN, Massachusetts Institute of Technology, OLGA KUKSENOK, VICTOR YASHIN, ANNA BALAZS, University of Pittsburgh, KRYSTYN VAN VLIET, Massachusetts Institute of Technology — Belousov-Zhabotinsky (BZ) gels are a unique class of stimuli-responsive materials that exhibit periodic changes in both color and size due to the self-oscillating kinetics of the BZ reduction-oxidation reaction. Such oscillations last for several hours, ending when a steady-state is reached in which the chemical reactants have been depleted. Here, we demonstrate that a depleted, non-oscillating BZ gel can be mechanically resuscitated, extending the oscillatory functionality of the material. These results represent the first experimental demonstration of mechanically induced oscillations in N-isopropylacrylamide-Ru(bpy)₃ gels. We characterize this phenomenon by quantifying the critical stress required to trigger oscillations, and the dependence of period and amplitude for triggered oscillations as a function of malonic acid concentration. Lastly, we demonstrate sensor applications comprising arrays of discrete BZ gel discs in which individual gels oscillate in color upon compression and have the capacity to transmit chemical signals away from the deformation site.

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