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Effect of light attenuation on motion of photo-responsive polymer gels PRATYUSH DAYAL, OLGA KUKSENOK, ANNA C. BALAZS, University of Pittsburgh — Nature has found an efficient way to utilize chemical reactions to produce mechanical work. Whenever the need for energy arises, the chemical reactions in our body produce energy, which is used to generate mechanical response. Scientists have been trying to replicate the same functionality in man-made systems. One of the recent approaches couples the Belousov-Zhabotinsky (BZ) reaction and the mechanical properties of the gel to produce self-sustained oscillations. To study the effect of light on the mechanical behavior of the gel, we use our recently developed 3D gel lattice spring model (gLSM) which couples the BZ reaction kinetics to the gel dynamics. In order to include the effect of the polymer on the reaction kinetics, the Oregonator model for the photo-sensitive BZ reaction was modified. Using modeling and simulations, we have been able to control gel's shape and its locomotion using light as an external stimulus. Here we show that the intrinsic non-homogeneity in light intensity, created by gel can induce autonomous motion of the gel away from light.

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