

Abstract Submitted  
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**Swelling and Shrinking Dynamics of Monodomain Nematic Elastomers** KENJI URAYAMA, RYO MASHITA, YUKO ARAI, TOSHIKAZU TAKIGAWA, Dept. Mater. Chem., Kyoto Univ., Kyoto 615-8510, Japan — We demonstrate that the swelling and shrinking of monodomain nematic elastomers in solvents exhibit unusual dynamics because of the presence of shape and volume variation modes with markedly different rates. A variation in the degree of orientational order induced by temperature (T) jumps causes a spontaneous deformation along the director as well as a change in the chemical potential of the solvent inside the gel. The former effect results in an almost instantaneous shape change, whereas the latter drives a slow volume change governed by the diffusion of polymer networks. The markedly different rates of these two modes cause unique dynamics: (i) a pronounced over- or undershoot of the specimen dimensions occurs in the direction where the shape and volume variations act to change the dimensions in the opposite manner, and (ii) a large dimensional change (more than 50 percent of the total change) takes place with almost no delay after the T-jumps in the direction where these two effects on the dimension synchronize.

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