Liquid Transport in Active Soft Matter

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Abstract

A gel is made of a polymeric network, swollen with a liquid solvent; its steady state is due to the balance of elastic and chemical energy. In active gels, the free length of the polymer chains can be varied by external stimuli, and this change yields a liquid displacement until a new steady state is achieved. Here, we are interested in the dynamics of active gels, and we present a model using the perspective of continuum physics: the activation of the polymer network is viewed within the context of a stress-diffusion theory, augmented with the theory of growth and remodeling. This model can describe some key features of the dynamics of contractile gels; the results of the model will be compared and contrasted with the observations of actual experiments.

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