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Using dissipative particle dynamics to model micromechanics of responsive hydrogels[1] ALEXANDER ALEXEEV, SVETOSLAV NIKOLOV, ALBERTO FERNANDEZ DE LAS NIEVES, Georgia Institute of Technology — The ability of responsive hydrogels to undergo complex and reversible shape transformations in response to external stimuli such as temperature, magnetic/electric fields, pH levels, and light intensity has made them the material of choice for tissue scaffolding, drug delivery, bio-adhesive, bio-sensing, and micro-sorting applications. The complex micromechanics and kinetics of these responsive networks however, currently hinders developments in the aforementioned areas. In order to better understand the mechanical properties of these systems and how they change during the volume transition we have developed a dissipative particle dynamics (DPD) model for responsive polymer networks. We use this model to examine the impact of the Flory-Huggins parameter on the bulk and shear moduli. In this fashion we evaluate how environmental factors can affect the micromechanical properties of these networks.

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