

Abstract Submitted  
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**Mechanics and chemical thermodynamics of a temperature-sensitive hydrogel**<sup>1</sup> SHENGQIANG CAI, Harvard University, ZHIGANG SUO — A temperature-sensitive hydrogel is a network of polymers containing monomers, whose interaction with water molecules can be tuned dramatically by changing temperature. In most cases, the swelling ratio of a temperature-sensitive hydrogel changes discontinuously upon heating above or cooling below a critical temperature, which is called volume phase transition. Interestingly, the coexistence of swollen phases and shrunk phases are frequently observed in the experiments for temperature-sensitive hydrogels and additionally, people have also discovered that a uniaxial force can induce phase transition in a temperature-sensitive gel bar. In order to understand these phenomena, we studied the mechanics and chemical thermodynamics of a temperature-sensitive hydrogel bar, by using the free-energy landscape of a bar made from PNIPAM gel. Following Gibbs, we plot the phase diagram of a temperature-sensitive hydrogel bar under uniaxial force.

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