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Carne Calderer* (mcc@math.umn.edu), School of Mathematics, University of Minnesota, 206 Church St SE, Minneapolis, MN 55455. *Phase transitions between swollen and collapsed states of polymeric gels.*

We will present a variational theory of phase transitions between swollen and collapsed states of gels. We propose a free energy of gels as consisting of the elastic stored energy of the polymer and the Flory-Huggins energy of the solid-solvent mixture. We will study a family of variational problems arising in the minimization of the total energy subject to balance of mass constraints. An application to controlled drug delivery devices will be discussed. (Received August 15, 2007)