Polymeric gels have drawn much interest due to their wide range of applications. Polymeric gels can be used in diverse technologies, including medical devices, drug delivery, tissue engineering and stimuli-sensitive actuators. Extensive experimental works have been performed to investigate the large volume transition behavior of polymeric gels in response to external physical or chemical and biochemical stimuli. However, no current model can fully capture the swelling and deswelling behaviors of polymeric gels. In the present presentation, a thermodynamic model is introduced to describe the mass transportation and large deformation of polymeric gels. Following Gibbs and Huggins, this thermodynamic model takes external mechanic work, mixing energy and stretching energy between polymers and solvents as well as mass diffusion of small molecules into consideration. Future works on study the water states in polymer gels, crack and failure of polymer gels are presented.

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