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Effect of Geometry on Cavitation in Polymeric Gels SATISH MISHRA, SANTANU KUNDU, Mississippi State University — Pressurization of a defect in a soft elastic network results in elastic instability or cavitation. This phenomenon has been harnessed in developing cavitation rheology technique for probing local mechanical properties of soft polymeric gels. The Finite Element Analysis (FEA) of the cavitation process both in bulk sample and in cavitation geometry is presented here. The critical pressure for cavitation as a function of the elastocapillary number (ECN), which relates the elastic modulus of the material, the dimension of the initial flaw, and surface energy, have been captured. The system boundary has an effect on the cavitation and the critical pressure increases significantly for a confined geometry, i.e., for the case where the boundary is closer to the initial crack. Effect of solvent diffusion on the cavitation phenomena will also be presented. The modeling results will be compared with that obtained experimentally for pluronic gels.

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