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Large strain deformation behavior of polymeric gels in shear- and cavitation rheology SEYED MEYSAM HASHEMNEJAD, SANTANU KUNDU, Mississippi State University — Polymeric gels are used in many applications including in biomedical and in food industries. Investigation of mechanical responses of swollen polymer gels and linking that to the polymer chain dynamics are of significant interest. Here, large strain deformation behavior of two different gel systems and with different network architecture will be presented. We consider biologically relevant polysaccharide hydrogels, formed through ionic and covalent crosslinking, and physically associating triblock copolymer gels in a midblock selective solvent. Gels with similar low-strain shear modulus display distinctly different non-linear rheological behavior in large strain shear deformation. Both these gels display strain-stiffening behavior in shear-deformation prior to macroscopic fracture of the network, however, only the alginate gels display negative normal stress. The cavitation rheology data show that the critical pressure for cavitation is higher for alginate gels than that observed for triblock gels. These distinctly different large-strain deformation behavior has been related to the gel network structure, as alginate chains are much stiffer than the triblock polymer chains.

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