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Shear-Induced Heterogeneity in Associating Polymer Gels AHMAD OMAR, ZHEN-GANG WANG, California Institute of Technology — We study associating polymer gels under steady shear using Brownian dynamics simulation to explore the interplay between the network structure, dynamics and rheology. For a wide range of flow rates, we observe the formation of shear bands with a pronounced difference in shear rate, concentration and structure. This shear-concentration coupling is shown to result from a striking increase in the polymer pressure in the gradient direction along with the inherently large compressibility of the gels. We find that shear has only a modest influence on the degree of association, but induces marked spatial heterogeneity in the network connectivity. We attribute the increase in the polymer pressure (and polymer mobility) to this structural reorganization.

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