Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Shear Induced Morphology Evolution and Dynamic Viscoelastic Behavior of Binary and Ternary Elastomer Blends[1] XIA DONG, XIANGGUI LIU, WEI LIU, CHARLES C. HAN, DUJIN WANG, Beijing National Laboratory for Molecular Sciences, CAS Key Laboratory of Engineering Plastics, Institute of Chemistry Chinese Academy of Sciences — The morphology evolution and rheological response of a near-critical composition polybutadiene /polyisoprene blend and solution-polymerized styrene-butadiene rubber/polyisoprene/silica ternary composites after various shear flow were in situ studied with the rheological and rheo-optical techniques. The relationship between the morphology of the blend during the relaxation after the cessation of steady shear with different shear rates and their corresponding rheological properties was successfully established. It was found that the different shear-induced morphologies under steady shear would relax to the equilibrium states via varied mechanisms after the shear cessation. The storage modulus G' increased significantly in the breakup process of the string-like phase. In long time scale, silica slowed down the succeeding breakup of the string-phase domains and simultaneous coalescence of broken droplets, and then effectively reduced the droplets size and stabilized the morphology.

[1]The authors thank the financial support from National Natural Science Foundation of China (No.51173195).

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Date submitted: 10 Nov 2014 Electronic form version 1.4