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Rheological modeling relating mesoscopic morphology for polymer blends YUANZE XU, Dept. Macromol.Sci., Fudan University, Shanghai 200433, China, WEI YU, Department of Polymer Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, P.R. China, CHARLES C. HAN, PPCL, Joint Lab. of Polymer Science and Materials, Institute of Chemistry, Chinese Academy of Science, Beijing 100080, China — The key issue to model polyblends rheologically is to solve the problem of dynamic coupling between interfacial morphology and viscoelastic flow. This work will outline our approaches. The framework of irreversible thermodynamics was employed and the conformation of both polymer chains are introduced. By comparing with the ellipsoidal model, the constitutive equation of dilute immiscible viscoelastic blends is established. To construct the model of concentrated blends, the hydrodynamic interaction of drops was treated. The theoretical predictions were proved by measured rheological material functions and the drop dynamics in a four-roll mill rheometer. Even greater challenge exists in the formulation of multi-scale rheological model of immiscible blends with complex morphology evolution, including drop break-up and collapse. Experiments show how the interfacial processes are interfered by non-linear viscoelasticity of polymers.

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