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Application of the discrete slip-link model to bidisperse linear systems RENAT KHALIULLIN, JAY SCHIEBER, Illinois Institute of Technology — It has been shown that tube models can predict linear viscoelasticity (LVE) of monodisperse linear polymers well. The LVE predictions of bidisperse systems by these models are less good, since tube models essentially predict double reptation for blends. However, better agreement with data is obtained by using a phenomenological exponent of 2.2, which was proposed by Marrucci in 1985 and also recommended by Ruymbeke et al. in 2002. The exponent is hypothesized to be an effect of a new physics that was missing in the monodisperse case, either from non-binary entanglements or tube dilation. In previous works we showed that, although the LVE predictions of monodisperse systems by the discrete slip-link model (DSM) are at least as good as those made by tube models, there are significant differences in contributions to relaxation from polymer chain dynamics and environment dynamics between DSM and tube models. This observation suggests that tube models and DSM might yield different predictions for the observable relaxation modulus of bidisperse blends. In this work we show that DSM with only binary entanglements predicts bidisperse LVE at least as well as double reptation with the phenomenological exponent. Since no additional physics are required the parameters fit to monodisperse LVE may be used to predict polydisperse systems.

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