

A NUMERICAL STUDY OF DROP DEFORMATION AND BREAKUP IN SHEAR FLOW FOR VISCOELASTIC FLUIDS

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A simulation for binary mixtures of viscoelastic fluids is developed. The model uses a Ginzburg-Landau free energy for the chemical potential together with a multiphase momentum balance to model the two-phase flow, and the Giesekus or Tanner/Phan-Thien constitutive model for the extra stress. The model equations are solved together with the continuity equation, using the SCM finite-difference method. Simulations have been carried out for two-phase systems in homogeneous shear flow at super critical Capillary numbers and a viscosity ratio of unity. The effects of fluid elasticity and shear thinning on drop breakup will be discussed.