Brownian dynamics simulation of 10:1 bimodal dispersions under simple shear

박준동, 안경현*
서울대학교
(ahnnet@snu.ac.kr*)

Using Brownian dynamics simulation method, the rheological properties and microstructure of bimodally distributed particle suspensions were investigated. Changing the volume fraction of small particles from 5% to 20%, the rheological properties and microstructures were determined with the fixed volume fraction of large particles at 20%. To consider the interparticle forces between colloidal particles, analytic formulas for the double-layer interaction between spheres was used. Attractive interparticle force between the particles was applied, except the interaction between large particles, where repulsive force was imposed. We imposed simple shear flow in the range of 0.001~10 dimensionless shear rate, and compared the rheological property differences between mono-dispersed and bimodal system. The bimodally distributed suspensions showed different rheological properties in comparison with those of mono-dispersed ones. The microstructural changes of the small particles around the large particle were also observed at given shear rate and volume fraction. In addition structural indices such as pair distribution function and time average number density were used to analyze the microstructure.