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Shear Thickening in Bidisperse Dense Suspensions.[1] NELYA AKHMETKHANOVA, JEFFREY F. MORRIS, Levich Institute / Chemical Engineering Department, City College of New York, BULBUL CHAKRABORTY, Department of Physics, Brandeis University — Concentrated suspensions often demonstrate striking phenomena such as discontinuous shear thickening (DST) and shear jamming. Despite the increased interest in suspensions at and near these special flow conditions, bidispersity has not been well-studied for DST. We use a simulation model which accounts for short-range lubrication forces, frictional interaction and repulsion between particles, that has shown to successfully reproduce the essential rheological features of DST for nearly monodisperse suspensions. In this work we investigate bidispersity focusing on large to small particle size ratio up to 4, and fraction of large particles. We demonstrate that the rate-dependent suspension viscosity displays a significant reduction, going from discontinuous shear thickening to continuous shear thickening, as particle size ratio becomes larger. Furthermore, under low shear rate conditions the viscosity demonstrates a surprisingly gradual decrease as large particle fraction increases. We show that the observed behavior may be linked to particles undergoing ordering where they are arranged in layers that easily slip past each other..

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