

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

A continuum approach to study reversible shear thickening fluid behavior HUA-YI HSU, Department of Mechanical Engineering, National Taipei University of Technology — In this work we explore if it is possible to reproduce reversible shear thickening behavior by using continuum equations. A critical shear stress indicates the transition of reversible shear thickening. To the end it is noted that reversible shear thickening fluid behavior is affected by (i) Hydrodynamic force (ii) Brownian motion, and (iii) Electrostatic force. To incorporate the features, we simulate shearing flow between two walls in the presence of external potential source term. The shear- stress-versus-viscosity trend is similar to the experimental results. At low shear stress range, the viscosity decreases as the stress increases. After reaching the critical shear stress, the viscosity increases as the stress increases. An understanding of the overall force balance and the critical shear stress emerges from the governing equations.

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Date submitted: 15 Jul 2014

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