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Solid-fluid transitions at high sliding rates at Al/Al interfaces[1]
J.E. HAMMERBERG, B.L. HOLIAN, Los Alamos National Laboratory, R. RAVELO, University of Texas, El Paso, T.C. GERMANN, Los Alamos National Laboratory — Large scale NonEquilibrium Molecular Dynamics (NEMD) simulations ($1.4\ 10^6$ atoms) for single crystal Al have shown a transition as a function of sliding velocity from a defective solid phase to a fluid phase beyond a critical velocity, v_c, which depends very nearly linearly with the homologous temperature T/T_m where T_m is the melting temperature and T is the sample temperature far from the interface. Above v_c, a Couette flow pattern develops with a slope which is independent of velocity. We discuss the properties of this transition and the power law dependence of the frictional force with velocity observed in this regime.

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