

Abstract Submitted
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Molecular Dynamics study of Tribological Phenomena at High Sliding Velocities¹ KARTHIKEYAN SUBRAMANIAN, DAVID A. RIGNEY, Dept. of Materials Science and Engineering, The Ohio State University, Columbus, OH 43210, U.S.A. — Molecular dynamics (MD) simulations have been performed to obtain qualitative information on the response of crystalline and amorphous materials to sliding interactions, particularly at high speeds. The results help to explain the formation of tribomaterial that is mechanically mixed and may be nanocrystalline or amorphous, depending on the system chosen. When the sliding speed is sufficiently high, the strain rate allows vorticity to develop. It is suggested that the resulting eddies are largely responsible for frictional energy dissipation and mechanical mixing. Similarities of flow behavior with that of fluids are noted. It is observed that the friction force is sensitive to velocity. This may be due to changes in the flow properties of the material due to localized heating resulting from sliding.

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