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Dissipative mechanisms of the lateral friction in contact-mode atomic force microscopy of flexible alkane molecule films F.Y. HANSEN, Technical University Denmark, P. SOZA, Pontificia University Catolica Chile, H. TAUB, University of Missouri-Columbia, M. KIWI, U. VOLKMANN, Pontificia University Catolica Chile — Molecular dynamics simulations are used to investigate lateral friction in contact-mode Atomic Force Microscopy of tetracosane (n-$C_{24}H_{50}$) films. We find larger friction coefficients on the surface of monolayer and bilayer films in which the long axis of the molecules is parallel to the interface than on a surface of molecules with the long axis perpendicular to the surface, in agreement with experimental results. The simulations reveal that the strength of the attractive film-tip interaction is an important factor in energy dissipation and that molecular flexibility provides a major dissipative mechanism as manifested by torsional motion about the carbon-carbon bonds of the molecules.

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