

PHENOMENOLOGICAL THEORY OF BOUNDARY
FRICTION IN THE STICK-SLIP MODE

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S u m m a r y

A deterministic theory describing the melting of an ultrathin lubricant film between two atomically smooth solid surfaces has been developed. The lubricant state is described by introducing a parameter of excess volume that arises owing to the solid structure chaotization at its melting. The thermodynamic and shear kinds of melting are described consistently. The dependences of the stationary friction force on the lubricant temperature and the shear velocity of rubbing surfaces that move with respect to each other with a constant velocity have been analyzed. In the framework of a simple tribological model, the stick-slip mode of friction, when the lubricant periodically melts and solidifies, has been described. The influence of velocity, temperature, and load on the stick-slip friction has been analyzed. A qualitative comparison between the results obtained and experimental data has been carried out.