

Lubricated Friction and Mixed-EHL Transition in Patterned Soft Surfaces

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We will describe recent work on lubricated friction of two types of near-surface patterned soft solids. In the first, the surface is patterned by stripes of stiff and compliant regions. We show strong enhancement of sliding friction in the patterned samples compared to homogeneous controls. We interpret extra dissipation to be due to periodic vertical motion of the indenter as it slides over regions with periodically varying contact stiffness; this is supported by transient EHL simulations. The second set of samples contain an embedded subsurface mesh. In this case we also observe sliding friction enhancement but due to a different mechanism – we propose it is because of early transition from EHL to mixed regimes. We will conclude with a discussion of ongoing work on what controls transition from EHL to mixed lubrication in soft solids.