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Keynote talk

Thin Film Lubrication: Molecular Behaviours of Confined Liquids.

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The behaviour of lubricant molecules within a nano-gap, especially the molecules near the solid surface is very important to the property of the whole tribo-system. Thin film lubrication (TFL) theory has been invoked to characterize the molecular behaviours of lubricant film less than tens of nanometers, which effectively bridged the gap between elastohydrodynamic lubrication (EHL) and boundary lubrication. Unfortunately, the molecular model of TFL which was proposed 20 years ago has not been well proven. Recently a method based on surface-enhanced Raman spectroscopy developed in my group allows us to access the molecular behaviors near the solid surface, along with both the arrangement and orientation of the liquid molecules in TFL regime. The presentation attempts to systematically review the major developments of TFL, including works on experimental technologies, researches, and applications. Future prospects of relevant researches and applications will be also discussed.