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Modeling the Extreme-Pressure Lubricating Interface MATEY KALTCHEV, Department of Physics and Chemistry, Milwaukee School of Engineering, FENG GAO, Department of Chemistry, University of Wisconsin Milwaukee, JAVIER LARA-ROMERO, Universidad Michoacana de San Nicolas de Hidalgo, Morelia, Michoacán, Mexico, WILFRED TYSOE, Department of Chemistry, University of Wisconsin Milwaukee — Extreme-pressure lubricants are currently widely used in various areas of applications. However, despite of their common use, the fundamental aspects of the mechanism in which these lubricants reduce the friction coefficient are not clear yet. Earlier macrotribological experiments using chlorinated hydrocarbons have shown remarkable effectiveness. It has been proven that thin films that resemble those formed under tribological conditions can also be synthesized in ultrahigh vacuum when beams of chlorinated hydrocarbons are directed onto a clean iron surface. Here results obtained using X-ray photoelectron spectroscopy, temperature programmed desorption, atomic force microscopy and microtribological measurements of these films are presented. Substantial information about the fundamental properties and structure of this model lubricating interface is revealed. A mechanism of the formation of the interface under tribological conditions is also suggested.

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