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Effect of Humidity and Hydrophobicity on the Tribological Properties of Self-Assembled Monolayers YEN-CHIH LIAO, WILLIAM HARGROVE, BRANDON WEEKS, Texas Tech University — In this study, the tribological properties of two distinctive alkanethiol SAMs, 16-mercaptohexadecanoic acid (MHA) and 1-octadecanethiol (ODT) on gold substrates in various humidity conditions were examined by lateral force microscopy (LFM). The results suggest that hydrophobic ODT SAM is insensitive to humidity. The difference of lateral force signal is within $\pm 10\%$ regardless of humidity. The lateral force signal of hydrophilic MHA SAMs has a significant decrease in signal in humid environments. The influence of bulk water was also investigated by LFM. By imaging under water, the capillary force is eliminated on ODT SAMs, which leads to a lower lateral force. However, the lateral force image was reversed on MHA SAMs, which suggested that hydrophobic forces dominated in water.

Yen-Chih Liao
Texas Tech University

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