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Understanding the Assembly of Pi-Conjugated Dithiol Molecules on Metal and Semiconductor Surfaces YUEH-LIN LOO, DMITRY KRAPCHETOV, Chemical Engineering, University of Texas at Austin, HONG MA, ALEX JEN, Materials Science, University of Washington, DANIEL FISCHER, Materials Science, National Institute of Standards and Technology — We examined the assembly of terphenyl- (TPDT) and quaterphenyl-dithiol (QPDT) molecules on gold and gallium arsenide (GaAs) surfaces from ethanol (EtOH), tetrahydrofuran (THF), and mixtures of the two solvents using a combination of x-ray photoelectron spectroscopy, synchrotron-based near-edge x-ray absorption fine structure spectroscopy, and Fourier transform infra-red spectroscopy. While the molecular assembly on gold is solvent independent, our experimental results suggest that the assembly of both TPDT and QPDT on GaAs is extremely solvent dependent. Specifically, TPDT and QPDT form highly oriented monolayers with excellent surface coverage on gold substrates regardless of the solvent from which assembly occurred. When the molecules are assembled on GaAs, however, the surface coverage degrades with increasing THF fraction. Correspondingly, the molecules also become progressively less ordered. When assembled from pure THF, the molecules on GaAs are completely disordered and exhibit poor surface coverage. The origin of this dramatic solvent effect is currently under investigation.

Yueh-Lin Loo
Chemical Engineering, University of Texas at Austin

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