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Geometric and Electronic Structure of Self-Assembled Monolayers Grown on Noble Metal Substrates: Dodecanethiol on Au, Ag, Cu, and Pt HEIKE GEISLER, LAUREN POWELL, Dept. of Chemistry, Xavier Univ., SHAWN HUSTON, TIM SWEENEY, DANIEL BORST, CARL VENTRICE, Dept. of Physics, Univ. of New Orleans — The geometric and electronic structure of dodecanethiol ($C_{12}H_{25}SH$) SAMs on Au(111), Ag(111), Cu(111), and Pt(111)) substrates has been studied using angle-resolved ultra-violet photoelectron spectroscopy and low energy electron diffraction. The SAMs were grown both by vapor deposition in UHV and in solution. The electronic structure of the fully saturated SAM is similar on all of these substrates, with peaks observed at binding energies of 6.5, 10, 14, and 20 eV. The geometric structure of the molecular films at intermediate coverages is different for each substrate. Growth on Au proceeds through a well-ordered lying-down phase followed by a disordered phase and a well-ordered $\sqrt{3}$ standing-up phase at saturation. Initial growth on Pt(111) shows first a p(2x2)symmetry followed by a $\sqrt{3}$ symmetry, which indicates that the initial growth is via standing-up phases on Pt. This is followed by a disordered phase at saturation. Films on Ag show a great deal of disorder at all stages of growth.

Carl Ventrice
Dept. of Physics, Univ. of New Orleans

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