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Identification of Surface Debye Temperature of an Alkanethiol Self Assembled Monolayer on Au(111) by Low Energy Helium Diffraction JOSHUA WEST, Cal Poly Physics Department, NICHOLAS CAMILLONE III, Brookhaven National Laboratory, PETER SCHWARTZ, Cal Poly Physics Department, CAL POLY PHYSICS, SAN LUIS OBISPO TEAM, BROOKHAVEN NATIONAL LABORATORY TEAM — Using Low Energy Atomic Diffraction (LEAD), a nonperturbative and totally unpenetrating surface characterization technique, we have conducted measurements on the surface of self assembling monolayers (SAMs) of decanethiol on a Au(111) surface. Debye-Waller attenuation measurements were taken for substrate temperatures from 14.5 K to 110 K. For the lowest substrate temperatures, thermal Debye-Waller attenuation decreased consistent with a surface Debye temperature of about 100 K. The excellent order demonstrated by these particular data provided high resolution to six orders of the hexagonal peak (corresponding to the rt3 x rt3 thiol mesh). These data from higher order diffraction peaks allows us to more precisely measure the lateral thermal vibration of the terminal methyl groups, which is considerably less than previously reported

Peter Schwartz
Cal Poly Physics Department

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