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The Adsorption of C_{60} fullerene molecules on Nanostructured Au (111) XIN ZHANG, QUANMIN GUO, RICHARD PALMER, University of Birmingham, NANOSCALE PHYSICS RESEARCH LABORATORY TEAM — The sub-monolayer growth of C_{60} molecules on the Au (111) surface has been studied using STM in ultra high vacuum. The C_{60} molecules tend to form close-packed layers due to a strong inter-molecular interaction. However, within the close-packed layer, there are finer, secondary structures that are specific to each of all the three C_{60}/Au interfacial structures ($(2\sqrt{3}\times 2\sqrt{3})R30^\circ$, in-phase ($R0^\circ$) and $R14^\circ$) observed [1]. This is a consequence of the molecule-substrate interaction and our findings demonstrate a much more complex structural variation at the molecule-substrate interface than previously assumed. Furthermore, within the $R14^\circ$ C_{60} layer, slightly darker molecules (30 pm lower) aligned along the ã11-2õ direction with a ∼6 nm spacing are observed and these molecules are arranged in a reasonably well-ordered two-dimensional lattice. C_{60} molecules are also found to decorate the elbow sites of the herringbone reconstructed Au(111) even at room, and when fullerenes are deposited to arrays of fabricated monolayer gold stripes (gold-fingers) [2], the molecules show step-specific attachment where the step edges with the (111) micro-facet are preferentially populated.

[1] X. Zhang, F. Yin, R. E. Palmer and Q. Guo, *Surf. Sci.* 602 (2008) 885-892.
[2] Q. Guo, F. Yin and R. E. Palmer, *Small* 1 (2005) 76-79.

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