



In-situ monitoring of the growth of copper phthalocyanine films on InSb by organic molecular beam deposition

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Abstract

Thin films of the organic semiconductor copper phthalocyanine (CuPc) have been grown on the InSb(1 1 1)A 2×2 surface by organic molecular beam deposition (OMBD). Soft X-ray photoelectron spectroscopy (SXPS) using synchrotron radiation, low energy electron diffraction (LEED) and Raman spectroscopy have been applied to monitor the bonding and energy band line-up at the CuPc–InSb interface. LEED shows that the first layer of CuPc is ordered. SXPS data reveal that the chemical interaction between the overlayer and the substrate is limited. The lineshapes of the shallow In and Sb core levels change very little during the growth of the CuPc film. Emission from the valence states of both InSb and CuPc was also monitored and the valence band offset for this hybrid system was determined to be (0.75±0.14) eV. Raman spectroscopy confirms the limited interaction at the junction and further reveals that the structure of the CuPc film changes with increasing thickness.

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