

NC-AFM IMAGING OF PTCDA MOLECULES ADSORBED ON AIII-BV SEMICONDUCTOR SURFACES

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Ultrathin 3,4,9,10-perylene-tetracarboxylic-dianhydride(PTCDA) molecules assembled on InSb (001) $c(8 \times 2)/(4 \times 2)$ and GaAs (001) $c(8 \times 2)/(4 \times 6)$ reconstructed surfaces have been studied using frequency modulated atomic force microscopy (NC-AFM). For InSb substrate it is shown that during initial stages of growth, the [110] diffusion channel is dominating, which leads to formation of long PTCDA molecular chains parallel to [110] crystallographic direction on the InSb surface. In contrast, on GaAs surface the growth proceeds in the “sticks-where-it-hits” mode. In most cases the PTCDA molecules are imaged as dark features, despite the fact that they constitute elevated topographic forms. This indicates that imaging mechanism is dominated by repulsive interactions being either due to electrostatic forces, or due to the core-core repulsion. Finally, it is shown that the PTCDA/InSb is a suitable system for manipulation of single molecules by the AFM tip.

