Applied Physics Letters -- December 17, 2001 -- Volume 79, Issue 25, pp. 4124-4126

Energy level alignment driven by electron affinity difference at 3,4,9,10-perylenetetracarboxylic dianhydride/n-GaAs(100) interfaces

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(Received 6 August 2001; accepted 18 October 2001)

Ultraviolet photoemission spectroscopy (UPS) was employed to investigate the electronic structure upon deposition of 3,4,9,10-perylenetetracarboxylic dianhydride (PTCDA) on differently treated *n*-GaAs(100) surfaces. Interface dipoles are found to form according to the electron affinities (EA) of the substrates and PTCDA films at the interfaces and, consequently, the vacuum level alignment rule does not hold. The results demonstrate that the energy offset between the conduction band minimum of *n*-doped inorganic semiconductors and the lowest unoccupied molecular orbital of organic molecular films at the interfaces can be obtained using UPS by systematically varying the EA of substrates with a known band gap. ©*2001 American Institute of Physics.*

doi:10.1063/1.1426253
PACS: 73.20.At, 73.40.Kp, 71.20.Rv, 79.60.Jv Additional Information