Changes in the electronic structure of DiMePTCDI films on S-GaAs(1 0 0) upon exposure to oxygen

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Abstract

The electronic properties of N,N'-dimethyl-3,4,9,10-perylene tetracarboxylic diimide (DiMePTCDI) films deposited on S-GaAs(1 0 0) surfaces are studied by ultraviolet photoelectron spectroscopy (UPS). The energy position of the highest occupied molecular orbital (HOMO) of clean DiMePTCDI films is found to be at 2.04 ± 0.10 eV with respect to Fermi level. Exposure to oxygen results in a shift of the HOMO from its original position by 0.25 ± 0.10 eV towards the middle of the band gap. The shift explains the dramatic decrease of the current in the current–voltage (I–V) characteristics upon oxygen exposure of Ag/DiMePTCDI/S-GaAs(1 0 0) Schottky diodes.

Author Keywords: Schottky contacts modification; Organic materials; Energy level alignment

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