Applied Surface Science
Volume 234, Issues 1-4 , 15 July 2004, Pages 126-130
The Ninth International Conference on the Formation of Semiconductor Interfaces,

doi:10.1016/j.apsusc.2004.05.261 Cite or Link Using DOI

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

Gianina Gavrila, Henry Méndez, Thorsten U. Kampen and Dietrich R. T. Zahn

Institut für Physik, Technische Universität Chemnitz, D-09107, Chemnitz, Germany

Available online 28 July 2004.

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

79.60.−I; 81.07.Pr; 72.80.Le

Corresponding author. Tel.: +49 371 531 3088; fax: +49 371 531 3060.