

## Barrier height engineering of Ag/GaAs(100) Schottky contacts by a thin organic interlayer

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### Abstract

Thin films of 3,4,9,10-perylenetetracarboxylic dianhydride (PTCDA) were used as an interlayer for the electronic modification of Ag/*n*-GaAs(100) Schottky contacts. The electronic properties were investigated recording in situ current–voltage (*I*–*V*) and capacitance–voltage (*C*–*V*) characteristics. For H-plasma treated substrates the effective barrier height decreases from 0.81 to 0.64 eV as a function of the PTCDA layer thickness ( $d_{\text{PTCDA}}$ ). In the case of the sulphur passivated GaAs the effective barrier height first increases and then decreases, the overall range being 0.54–0.73 eV. The substrate treatment leads to a different alignment between the band edges of the GaAs and the molecular orbitals of the PTCDA, making it possible to determine the energy position of the LUMO transport level.

**Author Keywords:** PTCDA; Ag/GaAs(100); Au/*n*-GaAs diode

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