A48

INTERFACE STATE MAPPING IN A SCHOTTKY BARRIER OF THE ORGANIC SEMICONDUCTOR TERRYLENE

Peter Stallinga (1)*, H. L. Gomes (1), M. Murgia (2) and K. Mullen (3)

(1)Universidade do Algarve, FCT, Campus de Gambelas, 8000 Faro, Portugal. (2)CNR Istituto di Spettroscopia Molecolare, Via Piero Gobetti 101, 40129 Bologna. (3) Max Planck institute for polymer research, Ackermannweg 10 55128 Mainz, Germany.

The quality of the interface can have dramatic effects on the performance of electronic devices made of semiconductors. Such interfaces can, by introducing an offset in the band diagram facilitated or effectively block carrier injection. On the other hand, from silicon we know that charges trapped at the interface in deep states can have long life times and thus deteriorate the device performance. In the current work admittance spectroscopy was used to map the energetic distribution of interface states in a Schottky barrier of aluminum and vacuum sublimed terrylene, a ladder-type conjugated-polymer. This technique is equivalent to the one developed for MOS structures by Nicollian and Goetzberger in the early days of semiconductor devices. We found a density of interface states that varies from 2 x 10^12 per cm^2 per eV close to the valence band to 1 x 10^12 per cm^2 per eV towards mid gap. Such distributions are very reasonable compared to other semiconductors. This is the first time the density of interface states has been measured directly in an organic semiconductor with electrical measurement techniques. Complementary DC measurements reveal an activation energy of the bulk conduction to be 0.33 eV.