MULTIFUNCTIONAL ORGANIC FIELD-EFFECT TRANSISTORS BASED ON PHENTYL-VINYL END-CAPPED OF ANTHRACENE AND TETRACENE

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Thin films of organic π-conjugated molecules are of great interest for devices such as field effect transistors (FETs), light emitting diodes, light emitting field effect transistors and photovoltaic cells.[1] Organic light emitting transistors (OLETs) have a similar architecture to organic field effect transistor (OFETs) and the intensity of electroluminescence (EL) is controlled by the drain and gate voltage. This structure is ideal for improving the EL quantum efficiency and lifetime of organic semiconductors (OSCs) due to the different driving conditions comparing to organic light emitting diodes OLEDs. [2]

We compare new synthesized antracene and tetracene derivative, 2,6-bis[2-(4-pentylphenyl)vinyl]anthracene (DPPVAnt) and 2-(4-pentylphenyl)vinyl) tetracene] (PPVT)[3], used as an active layer to fabricate OLETs. PPVT and DPPVAnt are conjugated trans-phenylvinylene substitutes linked to tetracene and antracene cores, respectively, with a pentyl group as side chain.

For vacuum sublimated films of both compounds, we carried out optoelectronic characterisation in field effect transistor configuration and AFM study of the early sages of film growth. X-Ray diffraction (XRD) as well as various analytical techniques such as UV-Vis absorption and Fluorescence Spectroscopy was also used to study physical properties of the OSCs and thin film.

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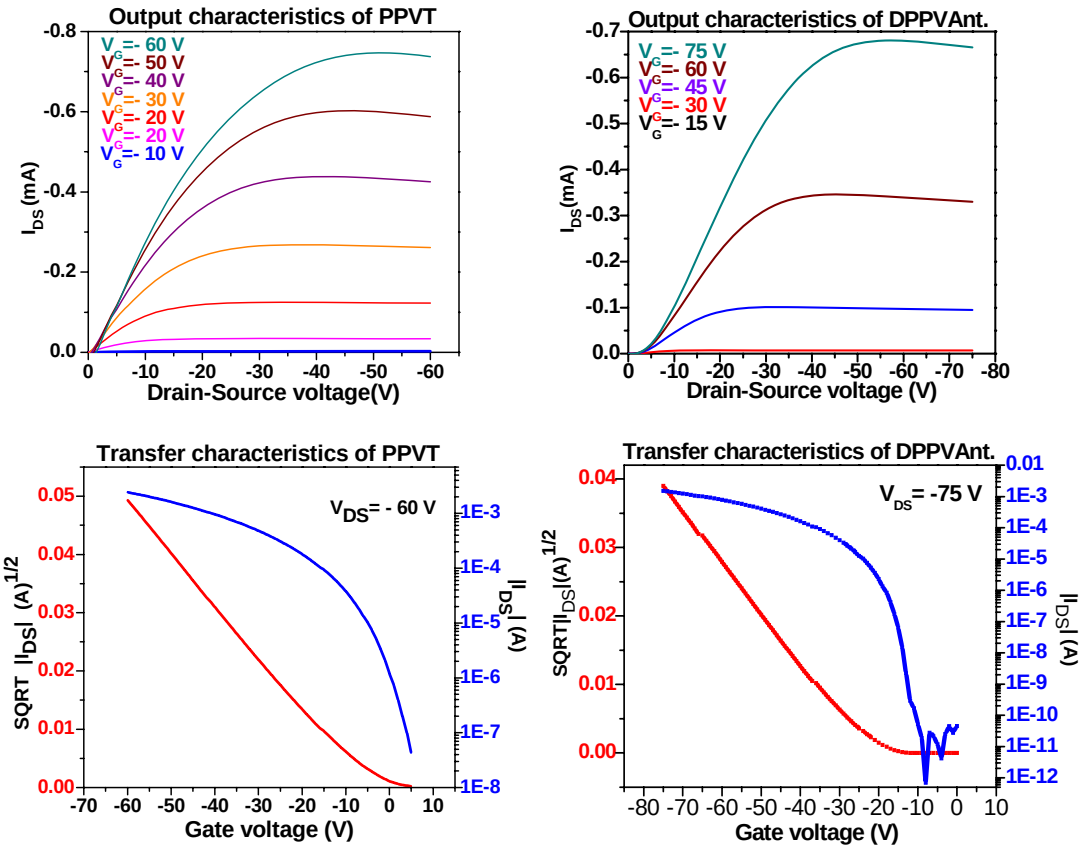

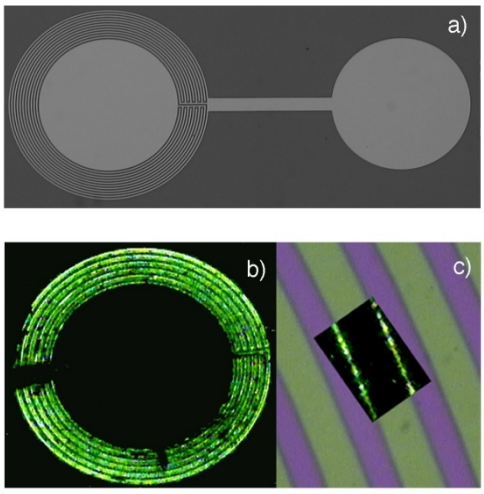

Optical images of: a) Interdigitated bottom-contact device b) Green electroluminescence of PPVT-LET c) magnified contacts and localized light emission