Supporting Information for:

Reorientation of the high mobility plane in pentacene based carbon nanotube enabled vertical field effect transistors

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Capacitance Measurements

Figure S1 shows capacitance plotted vs. the area of the top electrode. For all capacitances measured with the HP 4284A Precision LCR meter in parallel capacitance-resitance mode the parallel resistance was found to be greater than 100 MΩ. Linear fits to the data were forced through the origin. The slopes give the areal capacitance for the two thicknesses used. The 165 nm thick pentacene capacitor had an areal capacitance of 14.1 ± 0.3 nF/cm^2 and the 330 nm thick capacitor, 29.5 ± 0.6 nF/cm^2. Using the expression for capacitance,

$$C = \varepsilon_0 \varepsilon_r \frac{A}{d},$$

where A is the top electrode area and d the thickness of the pentacene layer, the relative permittivity ε_r can be estimated. These results give $\varepsilon_r \cong 5.4 \pm 0.3$. The values for the relative permittivity of pentacene are scarce in the literature and range from 3.7 to 6,[S1-S3] in reasonable agreement with our result.

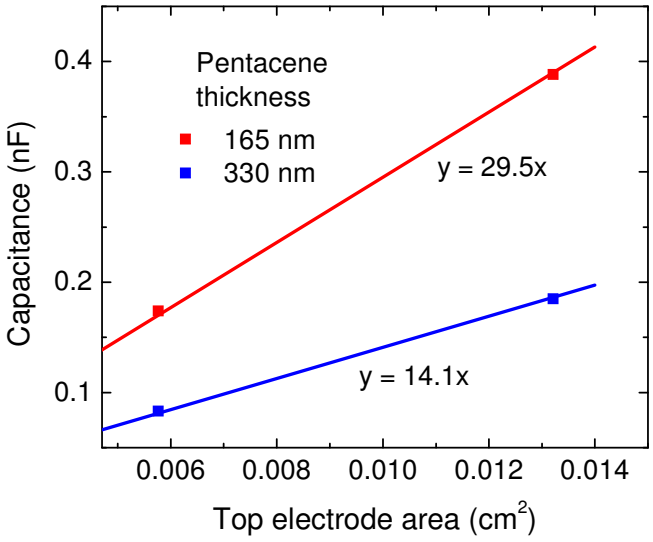

Figure S1. Capacitance versus area for each of the thicknesses of the pentacene layer used in Al/pentacene/Al MIM devices. Linear fits are forced through the origin. The slope gives the estimated areal capacitance in units of nF/cm^2.

S1. Lee, J.; Kim, S. S.; Kim, K.; Kim, J. H.; Im, S. Applied Physics Letters 2004, 84, (10), 1701-1703.

S2. Mun, S. J.; Choi, J. M.; Lee, K. H.; Lee, K.; Im, S. Applied Physics Letters 2008, 93, (23), 3301.

S3. Shimada, T.; Saiki, K. Journal of Electron Spectroscopy and Related Phenomena 2007, 154, (3), 119-122.