Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Control of Active Semiconducting Layer Packing in Organic Thin Film Transistors through Synthetic Tailoring of Dielectric Materials

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1-Bromoadamantane (99 %), bromine (99.5%) and iodomethane was procured from Sigma Aldrich and used as received. Aluminum chloride and aluminum bromide anhydrous, powder of 99.999% trace metal basis was supplied by Alfa Aesar. The dichloromethane, chloroform and tetrahydrofuran (THF) obtained from Alfa Aesar were dried and distilled from

sodium/benzophenone prior to their use. All other reagents and solvents were obtained from commercial suppliers and used as such, unless specified. It should be noted that all experiments were performed under dry nitrogen atmosphere and in standard fume hood.

1,3,5,7-Tetrabromoadamantane, 1,3,5,7-Tetraiodoadamantane. 1,3,5,7-Tetrachloroadamantane; was synthesized according to the reported literature.[1]

Synthesis of 1,3,5,7-Tetrauraciladamantane. 1,3,5,7-tetrabromoadamantane (1.97 g, 8.00 mmol) and anhydrous potassium carbonate (1.08 g, 7.8 mmol) were added to a solution of uracil (3.7 g, 33.03 mmol) in DMF and then the resulting suspension was stirred at 60 °C for 24 h. The insoluble material obtained was filtered out, washed with water. (3.14 gm, 68 %) ^{1}H NMR (DMSO, 300 MHz, TMS): δ = 10.98 (br, 4H), 7.41 (d, J = 9 Hz, 4H), 5.43 (d, J = 9 Hz, 4H), 1.68-1.54 (m, 12 H); star marks in ^{1}H NMR spectra indicates the solvent peaks.

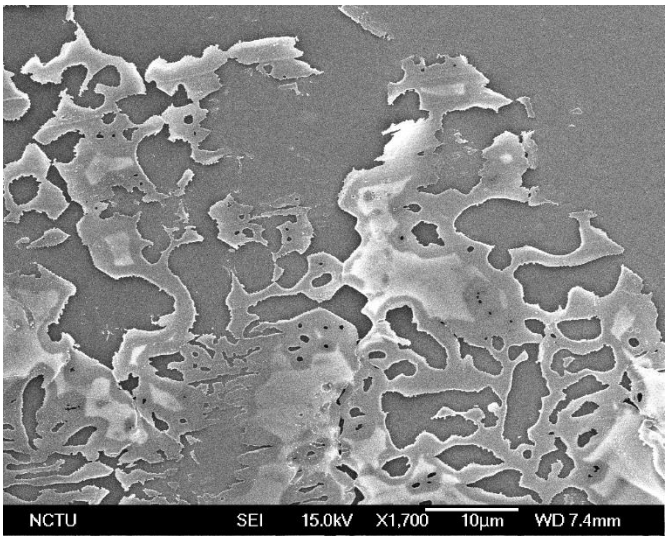

Figure S1

SEM image of supramolecular polymer thin film formed from $AdCl_4$ solution in THF at room temperature by following the Scheme 1.

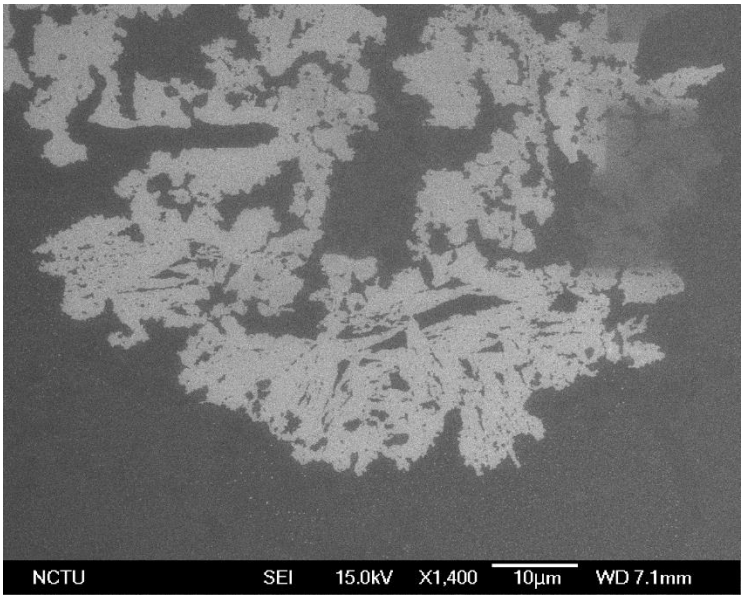

Figure S2

SEM image of supramolecular polymer thin film formed from $AdBr_4$ solution in THF at room temperature by following the Scheme 1.

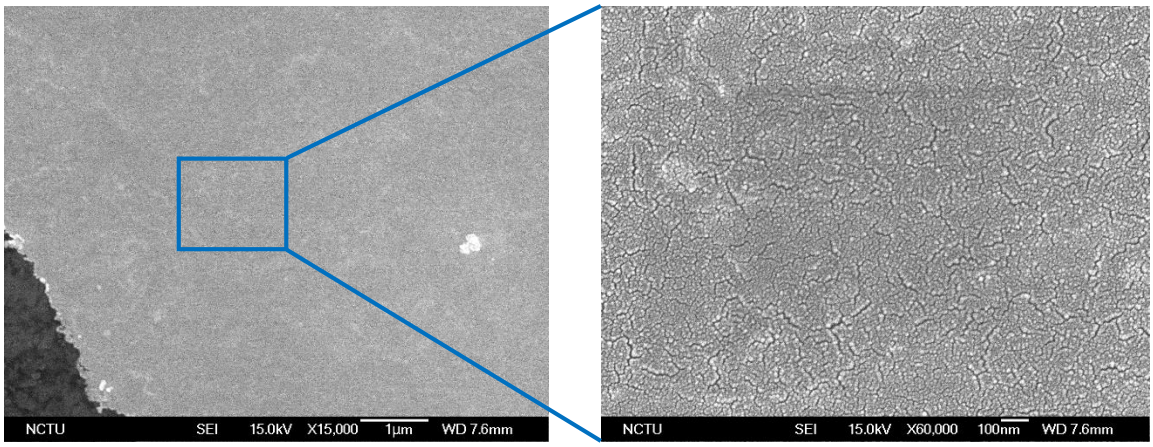

Figure S3

SEM image of supramolecular polymer thin film formed from AdI_4 solution in THF at room temperature by following the Scheme 1 and close up view of the AdI_4 supramolecular thin film.

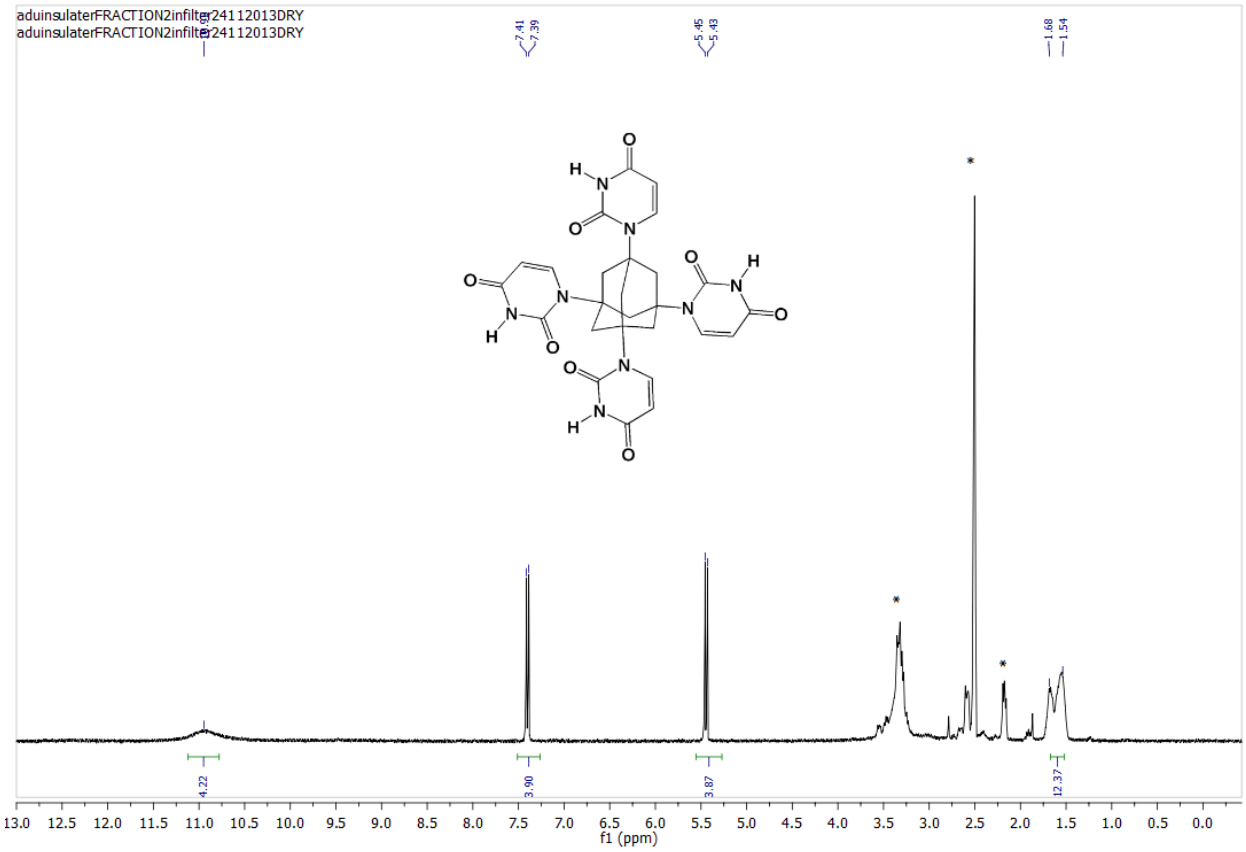

Figure S4

^{1}H NMR spectra of 1,3,5,7-tetrauraciladamantane in DMSO

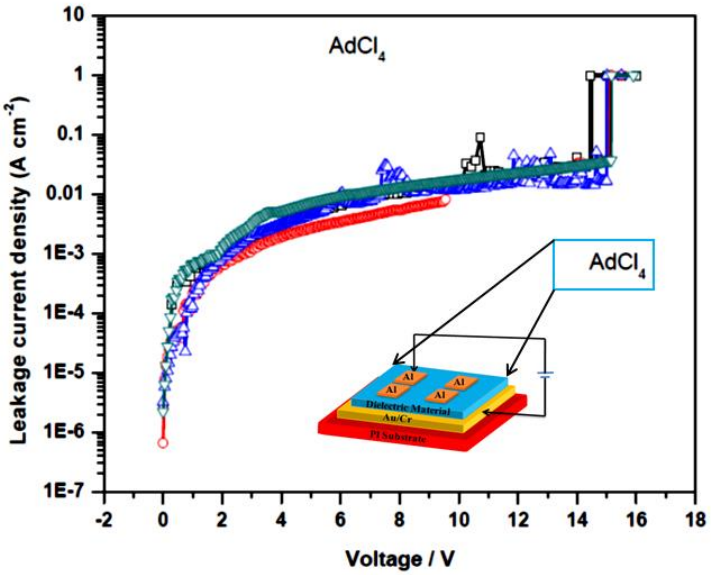

Figure 2 I-V measurement of flexible MIM structured devices fabricated on area of 5×5cm^2 on flexible PI plastic substrate using $AdCl_4$ as gate insulator layer respectively. The inset shows the respective MIM capacitor device configuration.

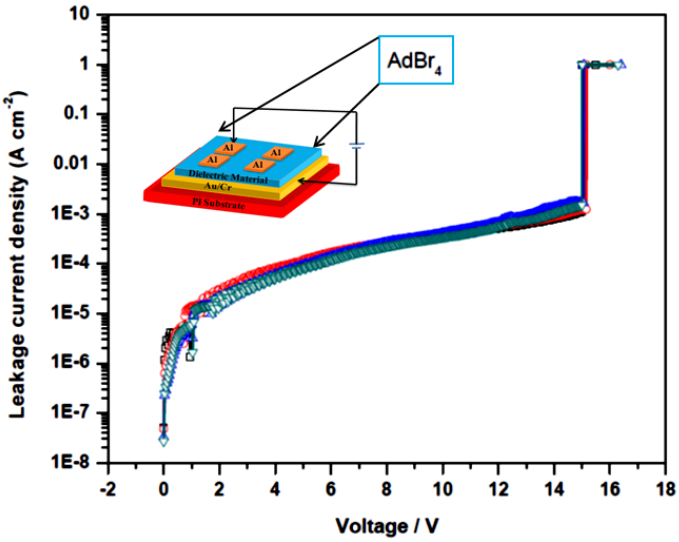

Figure 3 I-V measurement of flexible MIM structured devices fabricated on area of 5×5cm^2 on flexible PI plastic substrate using $AdBr_4$ as gate insulator layer respectively. The inset shows the respective MIM capacitor device configuration.

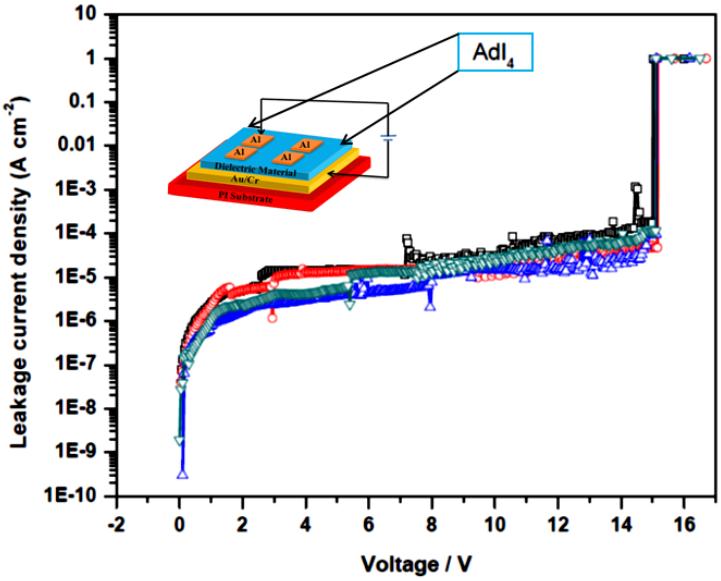

Figure 4 I-V measurement of flexible MIM structured devices fabricated on area of 5×5cm^2 on flexible PI plastic substrate using AdI_4 as gate insulator layer respectively. The inset shows the respective MIM capacitor device configuration.

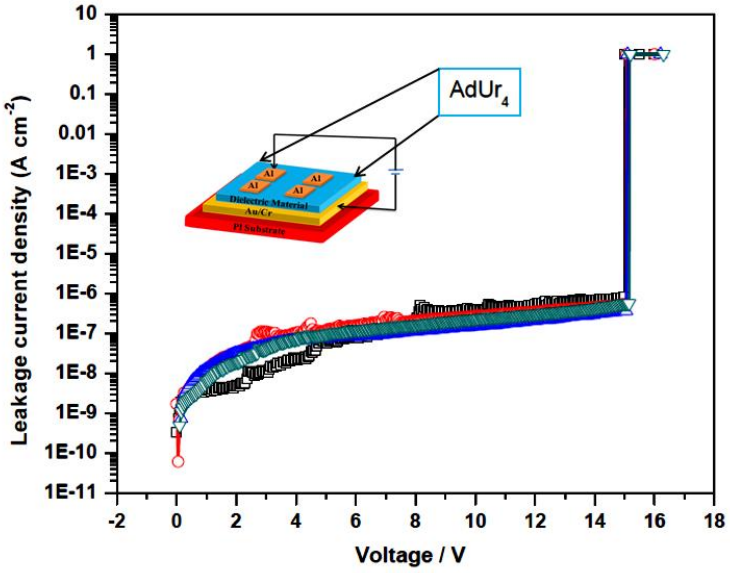

Figure 5 I-V measurement of flexible MIM structured devices fabricated on area of 5×5cm^2 on flexible PI plastic substrate using $AdUr_4$ as gate insulator layer respectively. The inset shows the respective MIM capacitor device configuration.

References:

1. Lee, G. S.; Bashara, J. N.; Sabih, G.; Oganesyan, A.; Godjoian, G.; Duong, H. M.; Marinez, E. R.; Gutie´rrez, C. G. *Org. Lett.* **2004,** *6*, 1705.