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 %) ¹H 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 ¹H NMR spectra indicates the solvent peaks.

![Figure S1](image.png)

**Figure S1**

SEM image of supramolecular polymer thin film formed from AdCl₄ solution in THF at room temperature by following the Scheme 1.
Figure S2
SEM image of supramolecular polymer thin film formed from AdBr₄ solution in THF at room temperature by following the Scheme 1.

Figure S3
SEM image of supramolecular polymer thin film formed from AdI₄ solution in THF at room temperature by following the Scheme 1 and close up view of the AdI₄ 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 5×5cm² on flexible PI plastic substrate using AdCl₄ 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 5×5cm² on flexible PI plastic substrate using AdBr₄ 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 5×5cm² on flexible PI plastic substrate using AdI₄ 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 5×5cm² on flexible PI plastic substrate using AdUr₄ as gate insulator layer respectively. The inset shows the respective MIM capacitor device configuration.
References: