

## Supporting Information for:

### A Photopatternable Pentacene Precursor for use in Organic Thin Film Transistors

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#### Experimental Details

*N-sulfinyl-tert-butylcarbamate.* Thionyl chloride (3.0 g, 0.025 mole) was added to a solution of imidazole (6.8 g, 0.1 mole) in 100 mL of anhydrous dichloromethane at 10 °C and the resulting solution was stirred at room temperature for 30 minutes. The mixture was filtered and the solid was washed with anhydrous dichloromethane. Combined filtrates were transferred to a flask and kept under nitrogen. To this solution was added additional thionyl chloride (3.0 g., 0.025 mole) and stirred for additional 30 minutes to give a light yellow solution of N-chlorosulfinylimidazole. The solution was added dropwise to a solution of tert-butylcarbamate (4.68 g, 0.04 mole) in 100 mL of anhydrous dichloromethane under nitrogen and the resulting solution was stirred at room temperature for 1 hr. The precipitate was filtered and washed with anhydrous dichloromethane. The combined filtrate was evaporated on a rotary evaporator at room temperature and the oily residue was distilled under high vacuum while the receiver flask was kept at -78 °C. The product, *N-sulfinyl-tert-butylcarbamate* was collected (B.P= 40-43 °C, 0.3 mm Hg) as a colorless liquid (3.8 g, 59%), IR (neat) 1743 cm<sup>-1</sup>.

*Pentacene- N-sulfinyl-tert-butylcarbamate adduct.* Cationic palladium catalyst [Pd (dppp)(PhCN)<sub>2</sub>](BF<sub>4</sub>)<sub>2</sub> was added to a mixture of pentacene (834 mg, 3 mmole) and *N-sulfinyl-tert-butylcarbamate* (980 mg, 6 mmole) in 50 mL of anhydrous chloroform and the mixture was refluxed under nitrogen for 4 hr. The solvent was evaporated under reduced pressure and the solid residue was purified by flash chromatography eluting with 1:1 hexane-dichloromethane and then with dichloromethane to collect the product. Adduct was obtained (700 mg, 71%) as a white microcrystalline compound, m.p. 163-165 °C (dec.). IR (KBr),  $\nu_{CO}$  1676 cm<sup>-1</sup>. UV-vis (thin film)  $\lambda$  (nm), 230, 254 and 308 (s). <sup>1</sup>H-NMR (CDCl<sub>3</sub>),  $\delta$  (ppm downfield from TMS): 1.5 (s, 9H), 5.85 (s, 1H), 6.7 (s, 1H), 7.52 (m, 4H), 7.86 (m, 5H), 8.01 (s, 1H), 8.03 (s, 1H), 8.06 (s, 1H). <sup>13</sup>C-NMR (CDCl<sub>3</sub>),  $\delta$  (ppm): 28.60, 70.62, 84.57, 124.51, 127.17, 127.22, 127.37, 127.53, 128.29, 128.39, 128.55, 128.57, 128.98, 129.22, 130.33, 132.95, 133.20, 133.32, 133.57, 134.90, 138.43, 154.21.

*Spin Coating, UV Exposure, and Heating.* Samples were prepared by spin coating a solution of the precursor (20 mg/ml) in CHCl<sub>3</sub>. When the PAG was incorporated, PAG concentration was varied systematically to obtain the best combination of image resolution, conversion time and conversion temperature. PAG concentration of 1 mg/ml was sufficient to convert the film to pentacene in a short time and at low temperature while at the same time preserving the resolution of the imaged patterns. Films were exposed to UV light at primarily 254 and 185 nm through a chrome/quartz mask. All heating was done in a dry nitrogen environment to avoid oxidation of pentacene, which occurs readily in the presence of water or oxygen.

*IR and UV-visible measurements.* IR measurements of the precursor before and after conversion to pentacene were taken on a Nicolet 870 FTIR spectrometer by transmission through a thin film spin coated onto a silicon wafer. The IR spectrum of pure pentacene was taken on a Bruker Equinox 55 FTIR spectrometer equipped with a Ge single crystal ATR element. UV-visible measurements were taken with a Shimadzu UV-2401PC spectrometer. Samples of the precursor before and after conversion to pentacene were taken by transmission through a thin film spin coated onto 1/16" thick quartz discs (GE). The pure pentacene spectrum was taken from a thin film of an emulsion in nujol, with a neat nujol film as the reference.

*Thin film transistors and device characterization.* Highly-doped Si with a 500 nm thermally grown oxide layer was used as the gate electrode. This substrate was coated with hexamethyldisilazane (HMDS) prior to the evaporation of gold contacts through a shadow mask. The precursor solution was spin coated and exposed to UV light through a contact mask that allowed the channel region to be illuminated along with a small region of the gold contacts. The remaining unconverted areas of the precursor film were then removed by rinsing in MeOH for 2 min with slight agitation. Device characteristics were measured with an HP4515a Semiconductor Parameter Analyzer.