## **Supporting Information**

## Fluoropolymer-Based Polymer Gate Dielectrics for Organic Thin-Film Transistors

SungYong Seo and Choongik Kim<sup>†,\*</sup>

Department of Chemistry, Pukyong National University, Busan 608-737, Korea <sup>†</sup>Department of Chemical and Biomolecular Engineering, Sogang University, Seoul 121-742, Korea <sup>\*</sup>E-mail: choongik@sogang.ac.kr Received February 22, 2012, Accepted March 30, 2012

## Experimental

**Materials.** Highly *n*-doped silicon wafers were cleaned by sonication in ethanol (200 proof) for 3 min and by oxygen plasma treatment for 5 min before use. Poly (4-vinyl phenol) (PVP) and pentacene was purchased from Aldrich and purified by gradient sublimation. poly(vinylidene fluoride-trifluoroethylene-chlorofluoroethylene) (P(VDF<sub>x</sub>-TrFE<sub>y</sub>-CFE<sub>1-x-y</sub>), x = 59.23, y = 31.62) was provided by Zhang group at Penn State University. Bis(3-triacetoxysilylpropyl)-ethylene ether (EGOAc) was synthesized following the procedure in the literature.<sup>1</sup>

**Fabrication and Characterization.** PVP, EGOAc, and P(VDF-TrFE-CFE) were individually dissolved in ethyl acetate and combined at a specific volume ratios. These precursor solutions were then spin-coated onto freshly oxygen plasma-treated substrates and then cured in vacuum

oven at 110 °C for 2-3 h. For OTFTs, pentacene were vacuum deposited at ~5 × 10<sup>-6</sup> Torr (500 Å, 0.2-0.3 Å/s) while maintaining the substrate temperature at 50 °C. Gold electrodes were vacuum-deposited through shadow masks at  $< 1 \times 10^{-6}$  Torr (500 Å, 0.5 Å/s). Electrical measurements (leakage current and OTFT response) were carried out under under vacuum using a Keithly 6430 subfemtoammeter and a Keithly 2400 source meter. Capacitance measurements were performed using a HP4192A impedance analyzer. Film thicknesses were measured using profilometer (Tencor, P10). Atomic force microscopic (AFM) images including RMS roughness were obtained using a JEOL-5200 Scanning Probe Microscope with silicon cantilevers in the tapping mode.

 Kim, C.; Wang, Z.; Choi, H.-J.; Ha, Y.-G.; Facchetti, A.; Marks, T. J. J. Am. Chem. Soc. 2008, 130, 6867.



**Figure S1.** AFM images (5  $\mu$ m × 5  $\mu$ m) of polymer gate dielectric – A. PVP:EGOAc (40 mg:40 mg in 2 mL of EtOAc), B. PVP:EGOAc:fluopolymer (40 mg:40 mg:20 mg in 3 mL of EtOAc), C. PVP:EGOAc:fluopolymer (40 mg:40 mg:40 mg in 3 mL of EtOAc), and D. PVP:EGOAc:fluopolymer (40 mg:40 mg:60 mg in 3 mL of EtOAc).