

Supporting Information for

**Metal Organic Frameworks in a Blended Polythiophene
Hybrid Film with Surface-Mediated Vertical Phase
Separation for the Fabrication of a Humidity Sensor**

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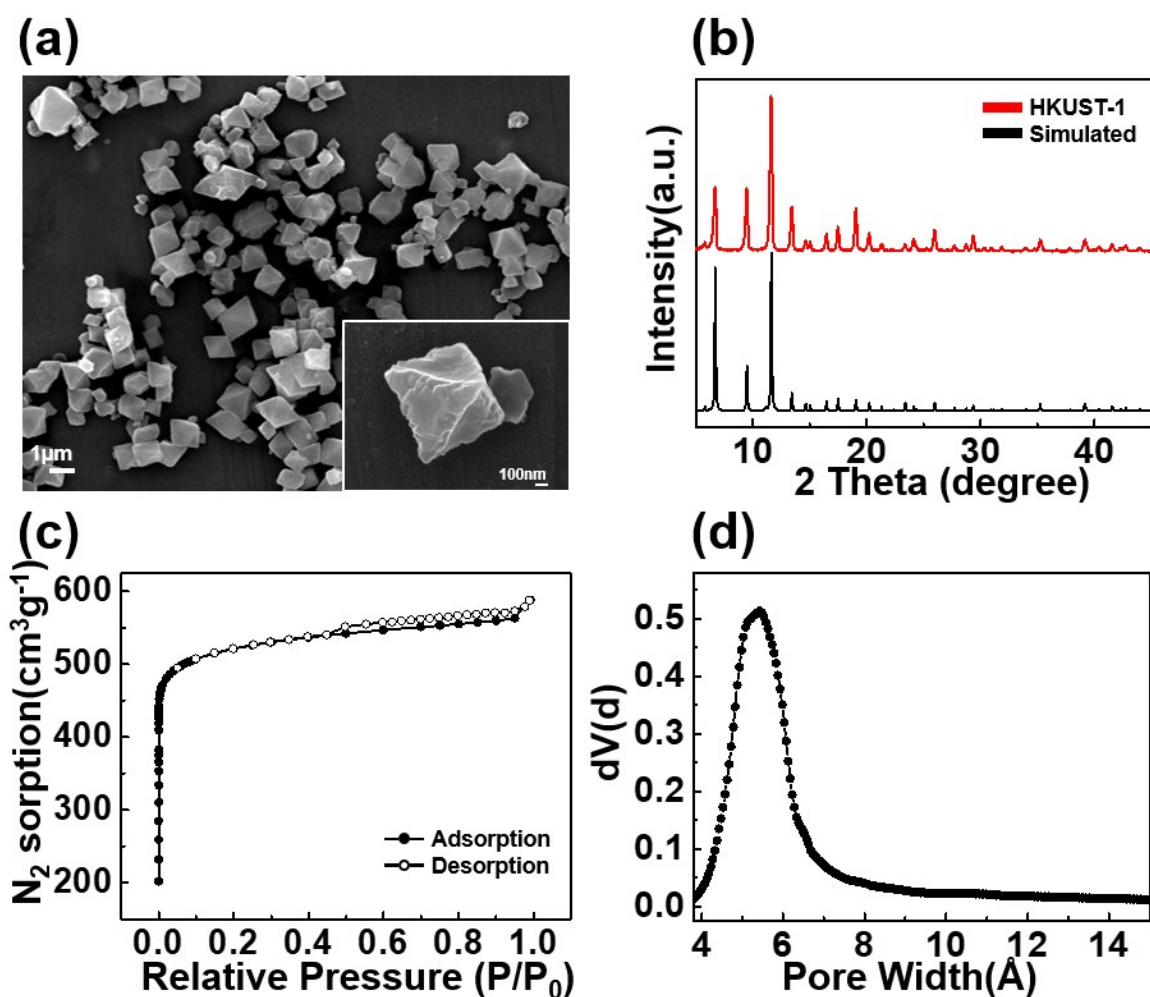


Figure S1. (a) Morphologies of the synthesized HKUST-1, characterized by a low and high (inset) magnification FE-SEM. (b) X-ray diffraction patterns of the simulated (black) and synthesized (red) HKUST-1, (c) N₂ adsorption isotherm at 298 K (surface area 2065 m²/g) and (d) DFT pore size distributions of HKUST-1 obtained from the N₂ isotherm at 77 K.

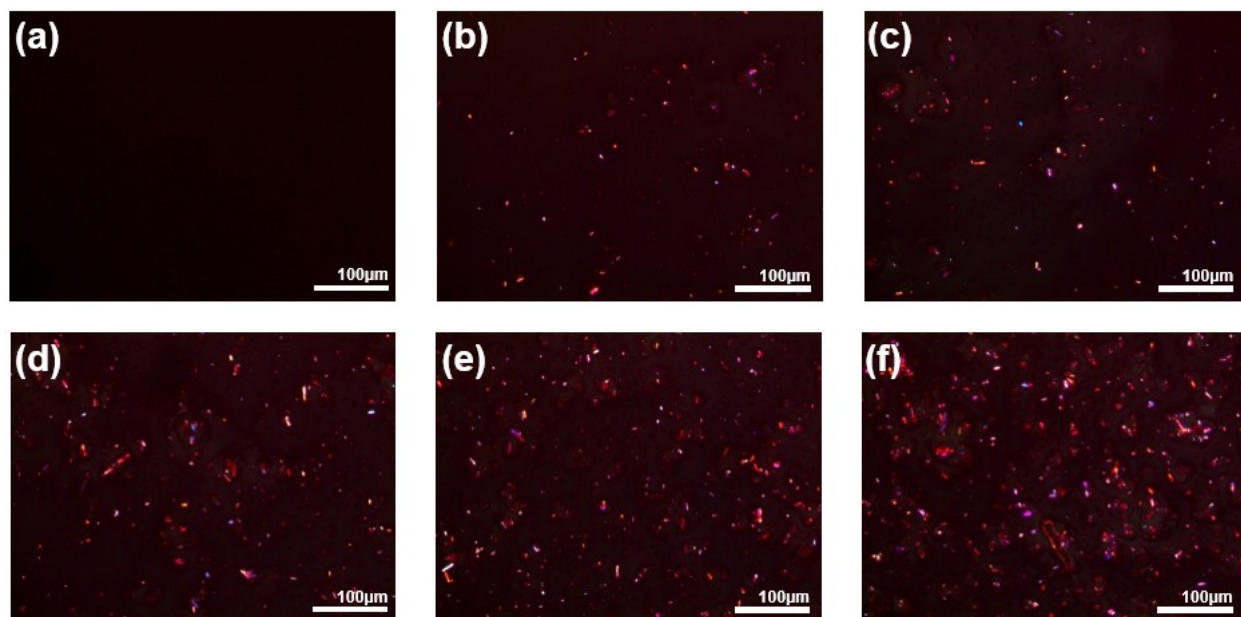


Figure S2. Polarized light microscope images of HKUST-1/P3HT films having various HKUST-1 contents, spin-coated onto cover glasses: (a) 0 mg, (b) 1 mg, (c) 2 mg, (d) 3 mg, (e) 5 mg, and (f) 10 mg HKUST-1, in a polymer solution (10 mg/mL).

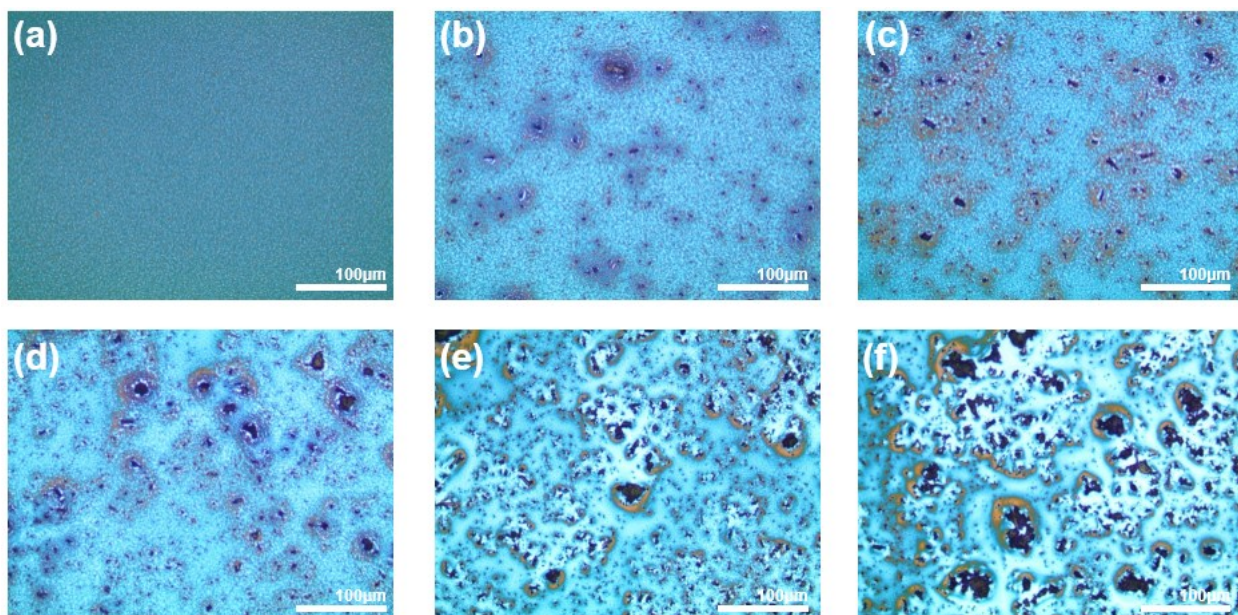


Figure S3. Optical microscope images of HKUST-1/P3HT films prepared with various HKUST-1 concentrations spin-coated onto a SiO_2/Si substrate: (a) 0 mg, (b) 1 mg, (c) 2 mg, (d) 3 mg, (e) 5 mg, and (f) 10 mg HKUST-1, in a polymer solution (10 mg/mL).

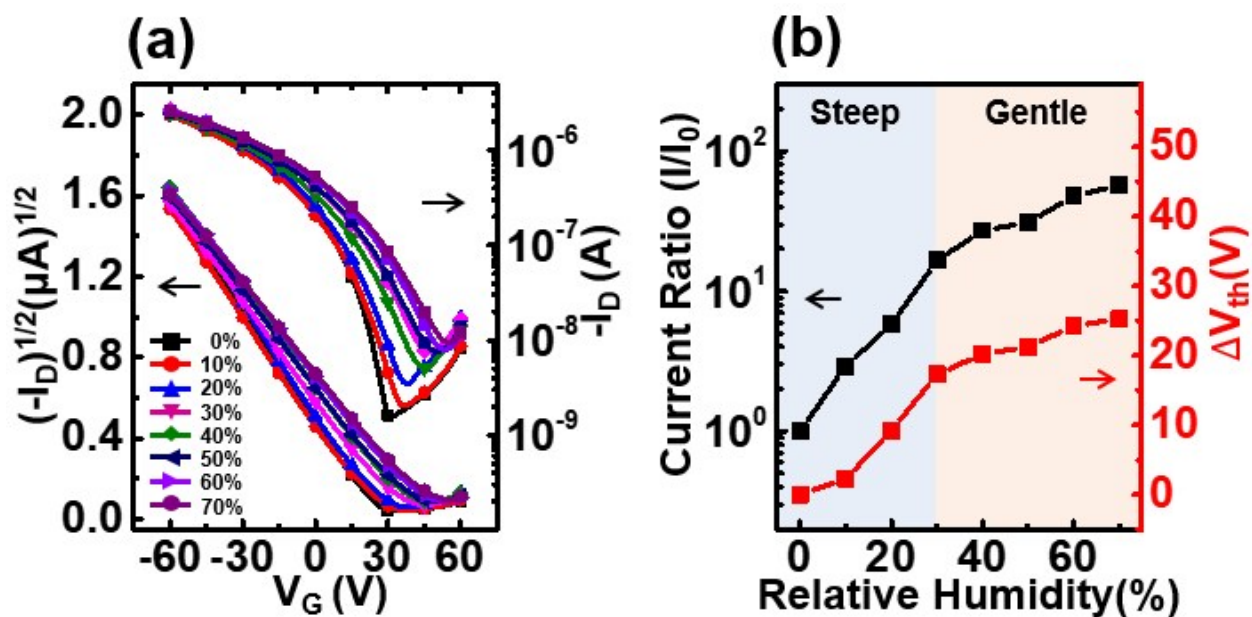


Figure S4. (a) Transfer characteristics (I_D - V_G) of a HKUST-1/P3HT hybrid film coated onto HMDS at a fixed drain voltage ($V_D = -60$ V) and at various relative humidity, from 0 % to 70 %. HKUST-1/P3HT films were prepared with 2 mg/mL HKUST-1 added 10 mg/mL P3HT solution. (b) Summary of the current ratios and the threshold voltages at $V_G = 25$ V as a function of the relative humidity.

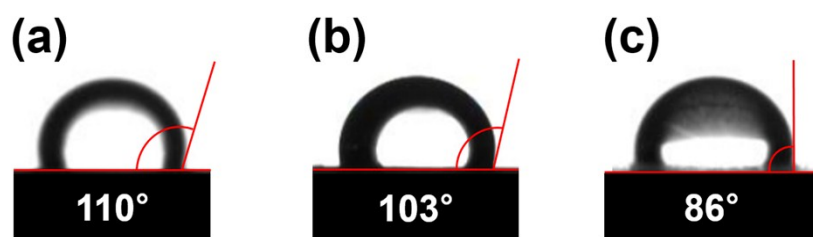


Figure S5. Water contact angles of the HKUST-1/P3HT coated films on an HMDS-treated SiO₂/Si substrate, as a function of the HKUST-1 content: (a) 0 mg/mL, (b) 5 mg/mL, and (c) 10 mg/mL HKUST-1.

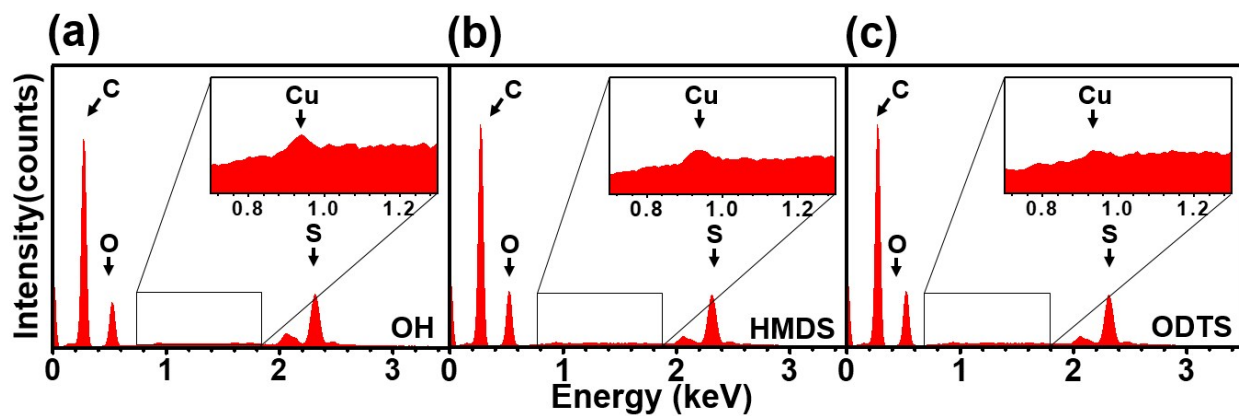


Figure S6. Point EDS data obtained from a flipped HKUST-1/P3HT film detached from (a) OH (b) HMDS (c) or ODTS substrates.

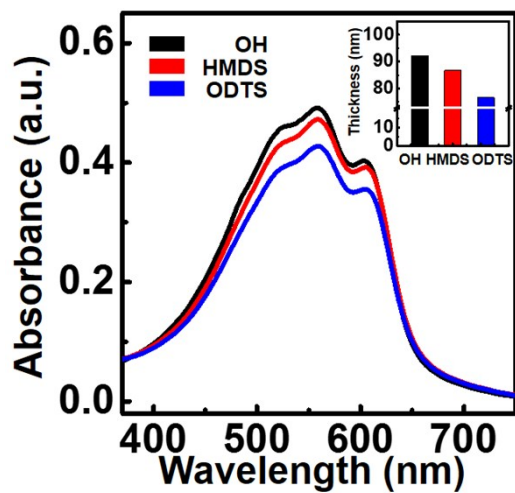


Figure S7. UV-Vis spectra of the HKUST-1/P3HT film coated onto the three substrates: OH, HMDS and ODTS. The inset shows the thickness values of each film which was determined by ellipsometer.