Supporting Information

Colocalized Nanoscale Electrical and Compositional Mapping of Organic Solar Cells

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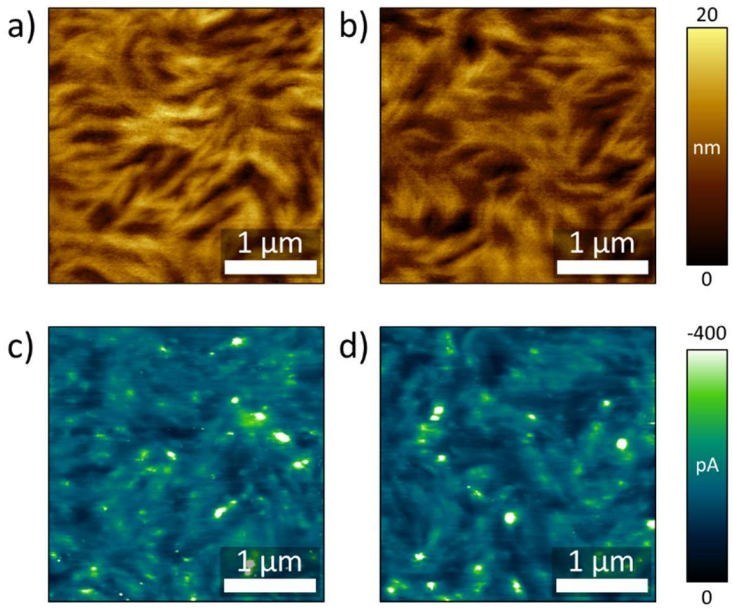

Figure S1. (a) Topography and (c) C-AFM current map of *p*-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM on PEDOT:PSS/ITO/glass. (b) Topography and (d) C-AFM current map of *p*-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM on a carbon-coated TEM grid mounted on PEDOT:PSS/ITO/glass. The average currents under a -3 V bias are -144 pA and -140 pA, respectively.

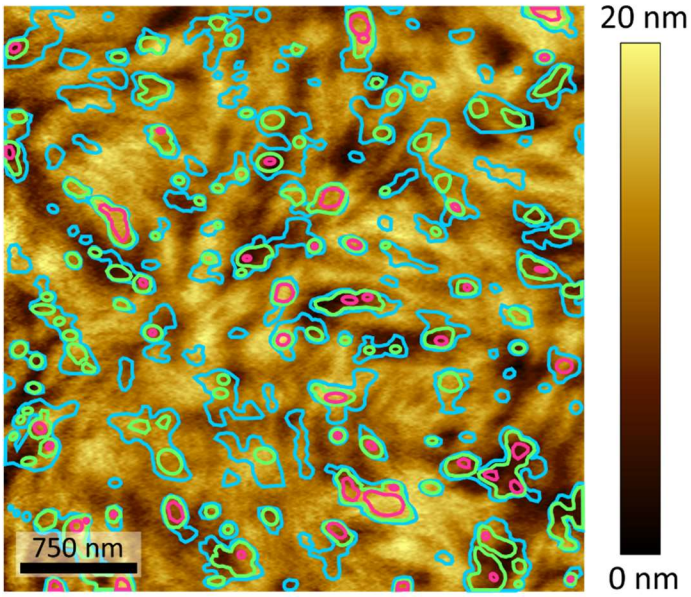

Figure S2. Topography map (from Figure 2a) with regions of high (>8 x 10^{-5} cm^2/V·s), elevated (>6 x 10^{-5} cm^2/V·s), and moderate (>3 x 10^{-5} cm^2/V·s) hole mobility (from Figure 2b) outlined in red, green, and blue, respectively.

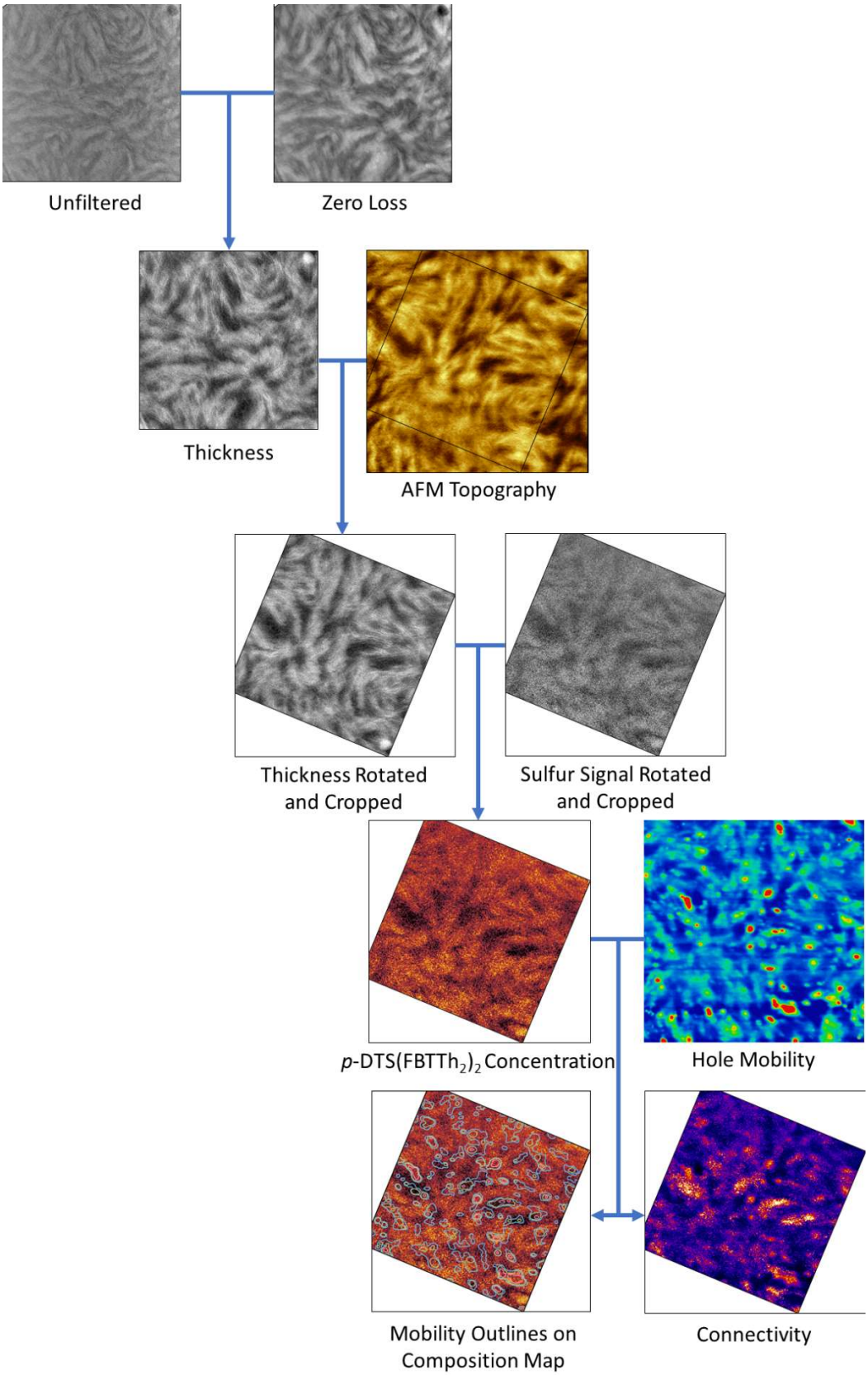

Figure S3. Flow chart outlining image processing steps.

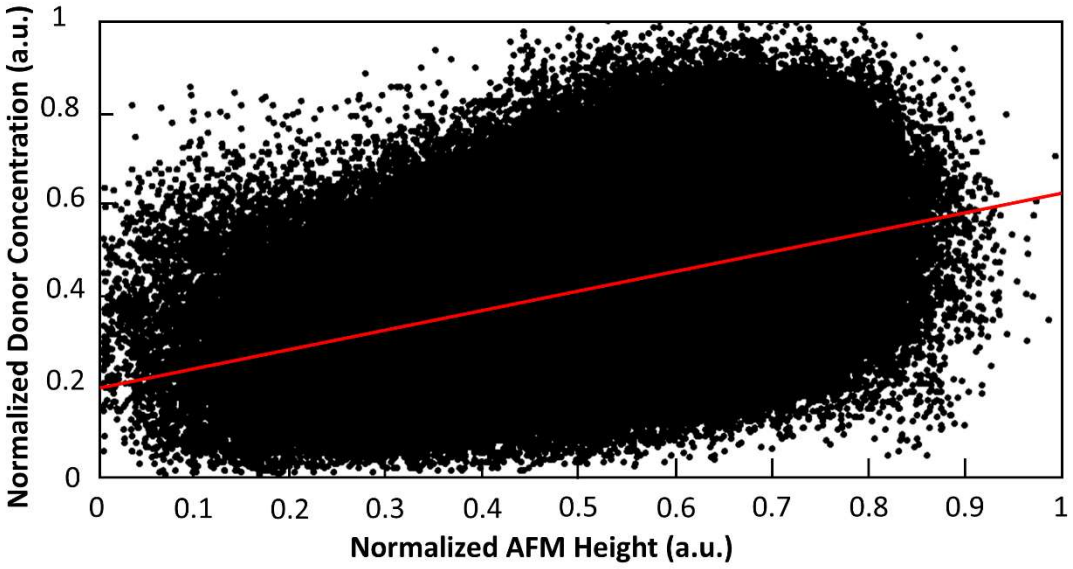

Figure S4. To determine whether topographic height from AFM can be used as an indicator of local donor concentration for a *p*-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM active layer, normalized donor composition was plotted against normalized AFM height. A linear fit is shown in red.

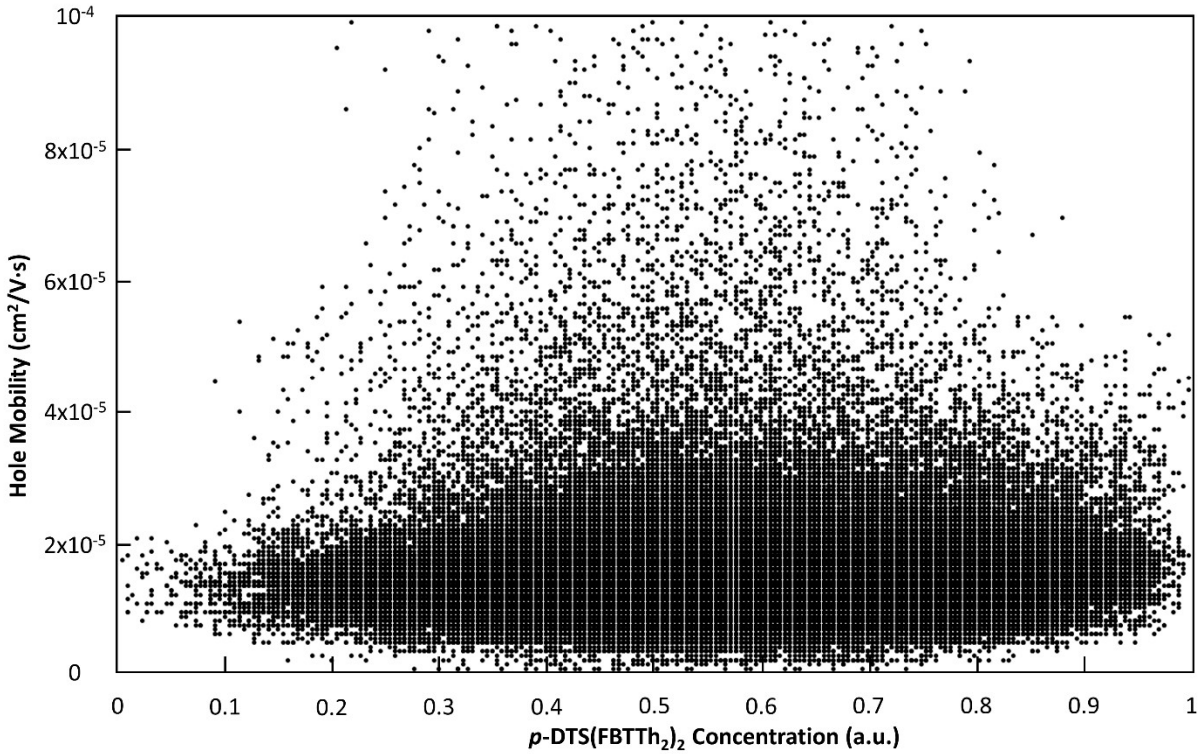

Figure S5. Relative hole mobility plotted against *p*-DTS(FBTTh$_2$)$_2$ concentration recorded at the same sample location, showing no discernible correlation.

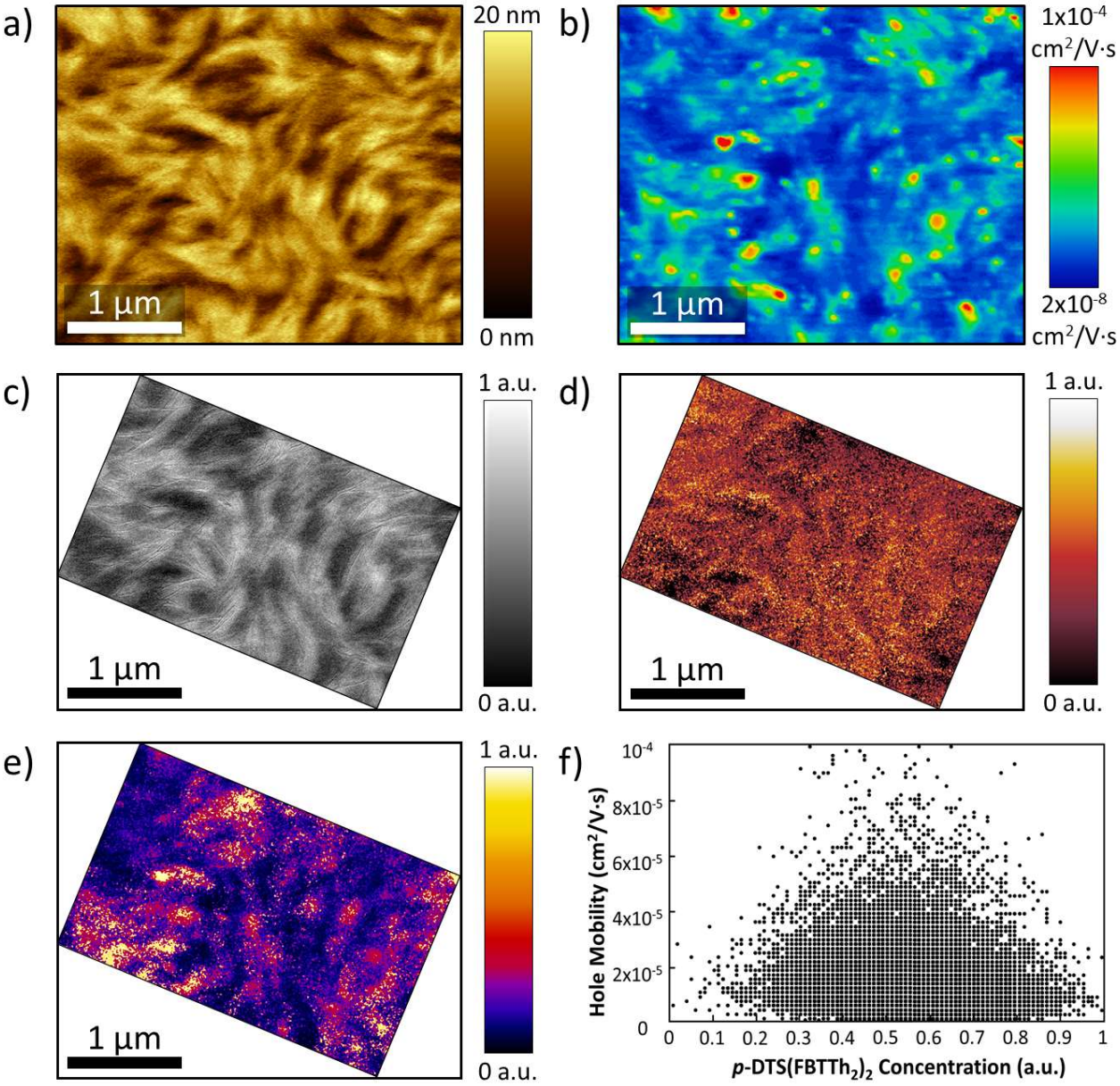

Figure S6. Structural and electrical mapping at the same location of a *p*-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM film: (a) topography acquired during PPIV mapping, (b) PPIV hole mobility, (c) thickness measured by TEM, and (d) donor concentration. (e) Connectivity map generated by dividing hole mobility (b) by donor concentration (d). (f) Relative hole mobility plotted against *p*-DTS(FBTTh$_2$)$_2$ concentration recorded at the same sample location, showing no discernible correlation.

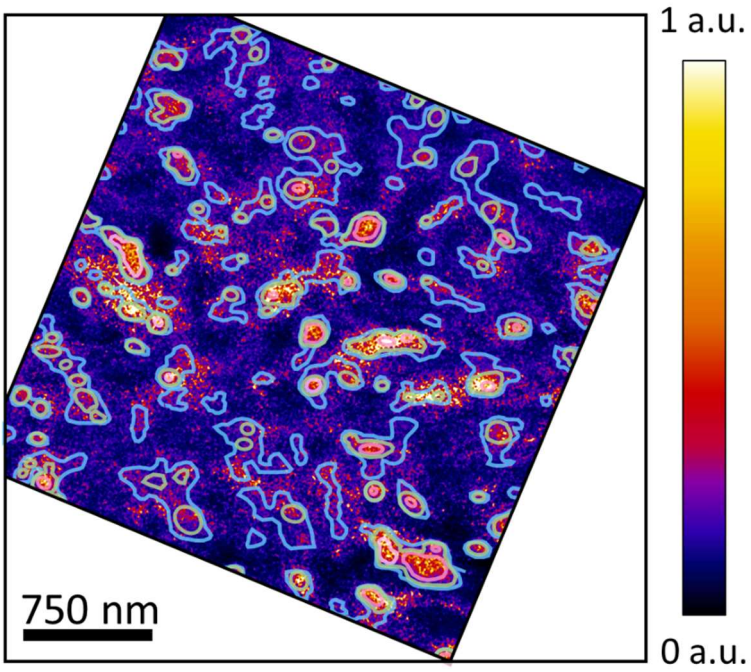

Figure S7. Connectivity map overlaid with outlines of high (>8 x 10^{-5} $cm^2/V{\cdot}s$), elevated (>6 x 10^{-5} $cm^2/V{\cdot}s$), and moderate (>3 x 10^{-5} $cm^2/V{\cdot}s$) hole mobility.