Supplementary Information

Charges on Nano-islands and Fibrils of Poly(3-hexylthiophene-2,5-diyl) – Light- Modulation, Injection and Transportation

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Quantification of photo-induced charges for nano-islands and fibrils based on P3HT revealed by SKPM and EFM

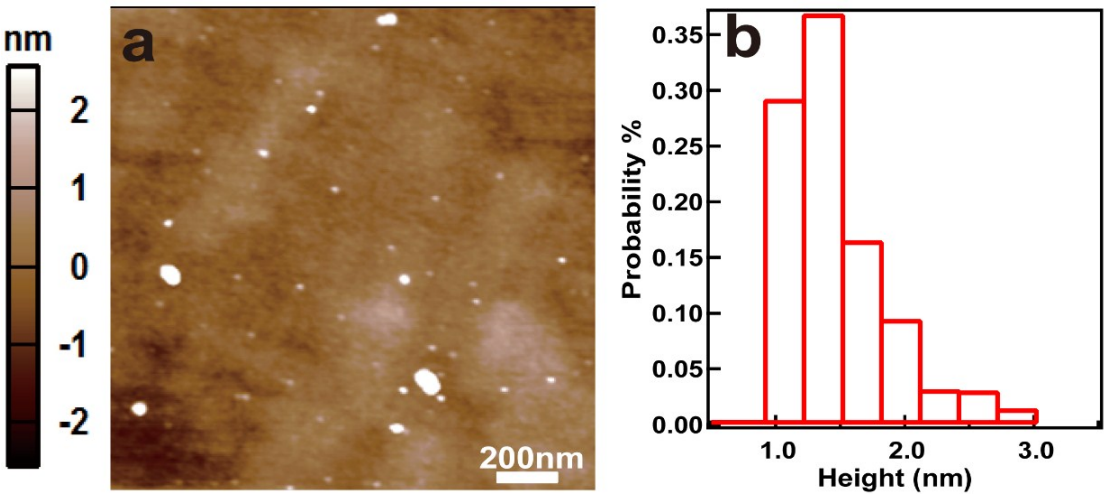

Figure S1. Topography and the distribution of CdS nanoparticles. The heights are almost below 3 nm, and only a very few are several hundred nanometers. Therefore they maybe hide under the islands.

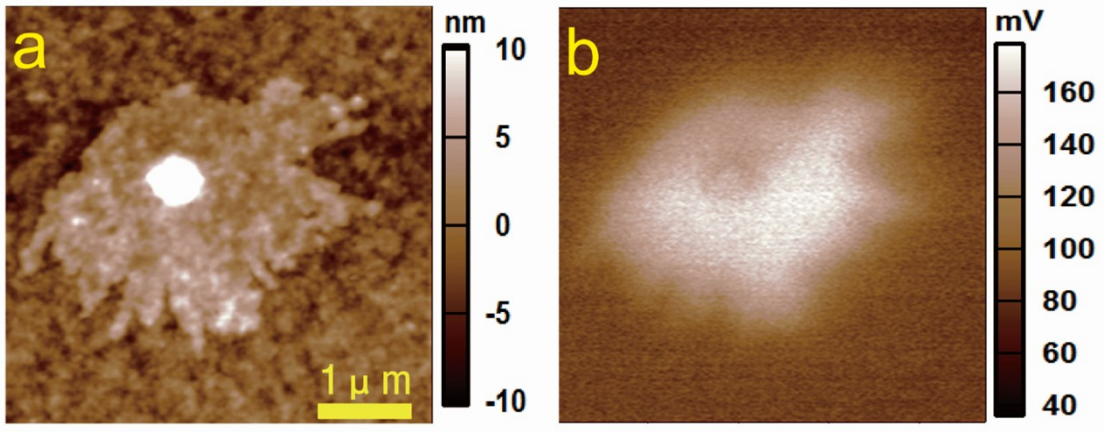

Figure S2. Topography and SKPM image of P3HT nano-islands coupled with CdS/CdSe nanoparticles. The surface potential of nanoparticle is lower than the island.

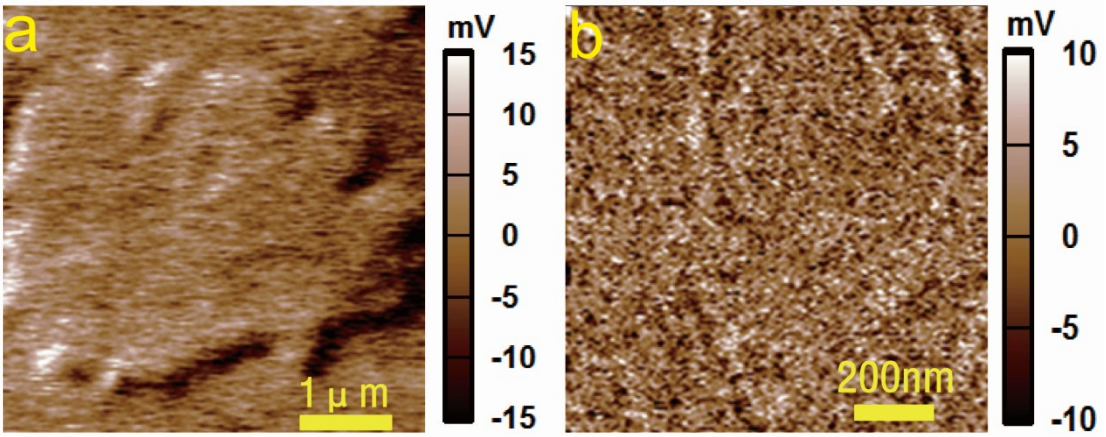

Figure S3. Differential SKPM images between light on and off for (a) nano-islands; (b) nano-fibrils.

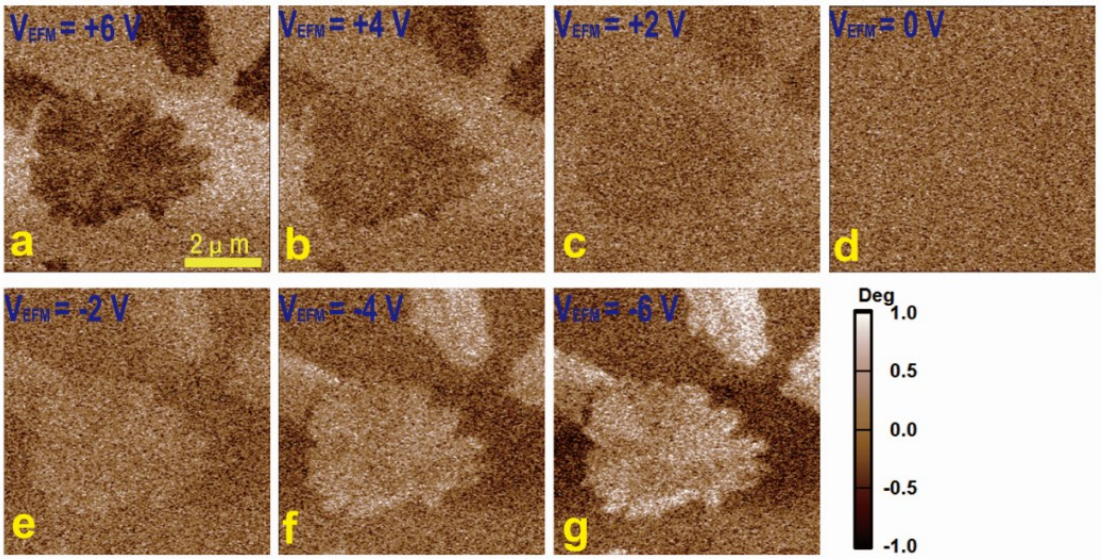

Figure S4. The detailed changes of phase shift of the P3HT islands with different bias to the tip of (a) +6 V, V_{EFM} = +6 V; (b) +4 V, V_{EFM} = +4 V; (c) +2 V, V_{EFM} = +2 V; (d) 0 V, V_{EFM}=0 V; (e) -2 V, V_{EFM}=-2 V; (f) -4 V, V_{EFM} = -4 V; (g) -6 V, V_{EFM} = -6 V. The color bar of EFM images displayed the relative phase shift with respect to the ITO substrate.

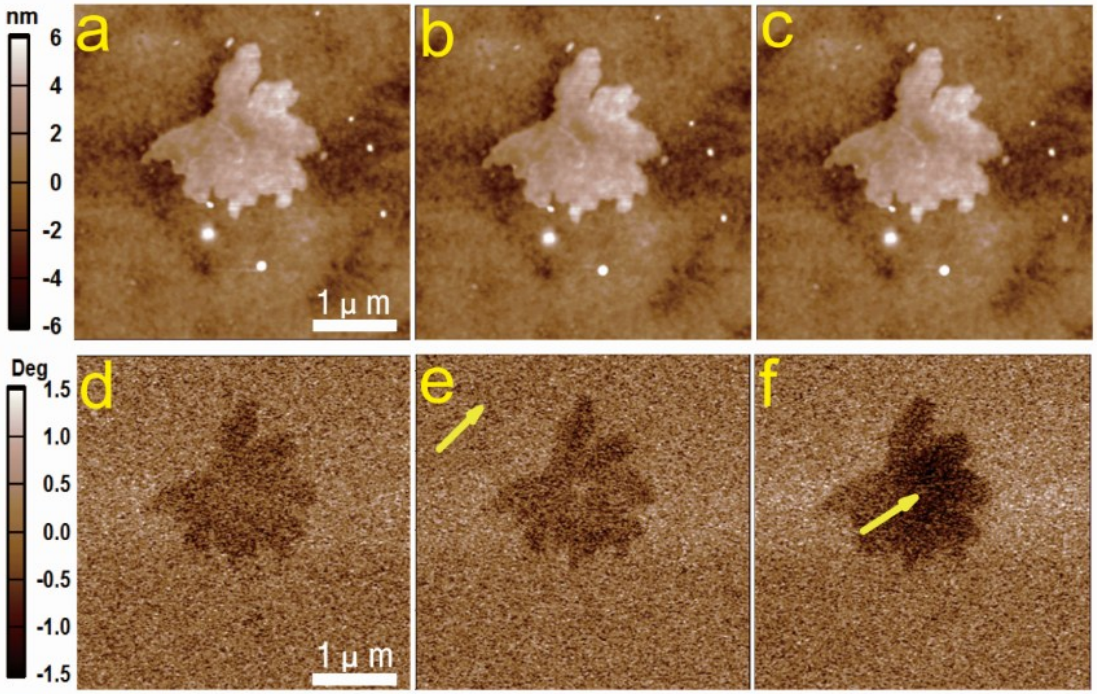

Figure S5. The comparison on ability to accept charges for P3HT islands and substrate. (a) Topographic image and (d) EFM image (phase shift, V_{EFM} = 3 V, z = 50 nm) before

charge injection. (b) Topographic image and (e) EFM image after charge injection (at the point marked by the arrow) at V_{INJ} = +5 V for 200 s. There is no change in the two images. (c) Topographic image and (f) EFM image after charge injection (at the point marked by the arrow) at V_{INJ} = +5 V for 200 s. The EFM image changed compare to the image before charge injection.

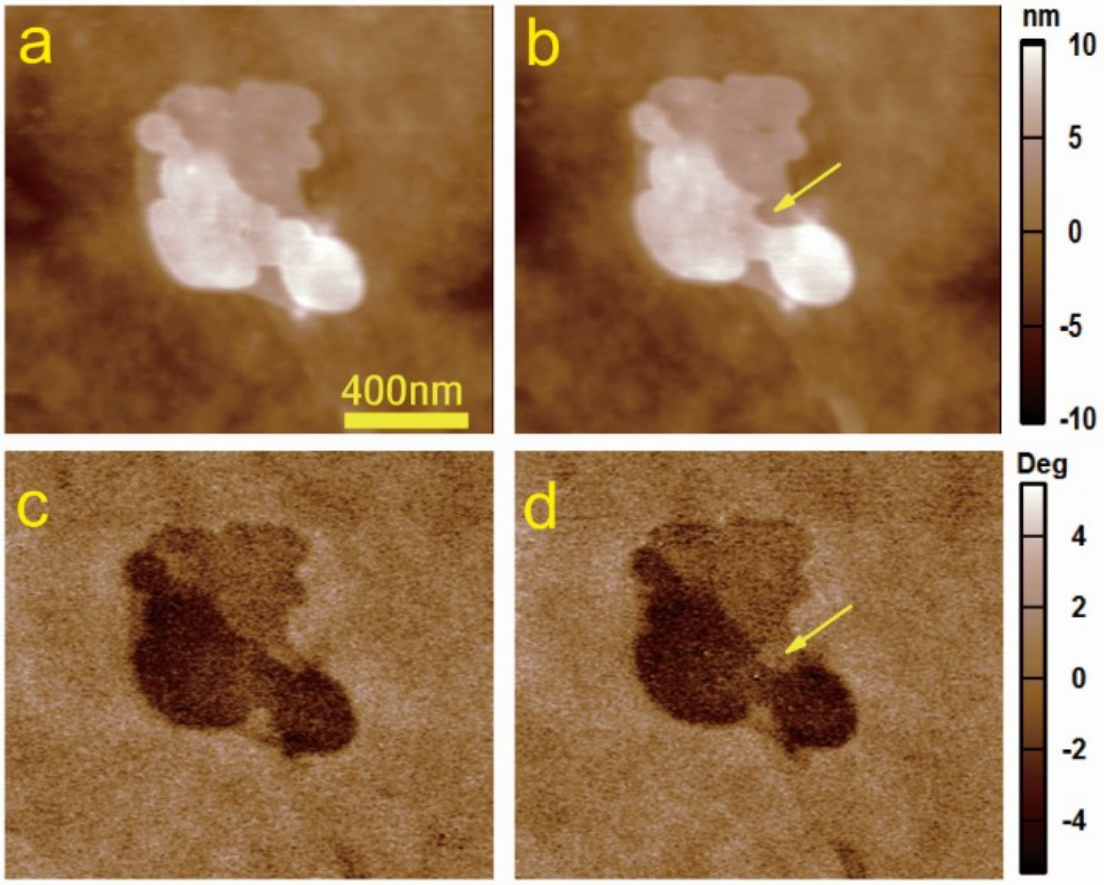

Figure S6. The changes on topographic and EFM images of P3HT islands on Si/SiO_2 by applying a negative voltage. (a) Topographic image and (c) EFM image (phase shift, V_{EFM} = 3 V, z = 50 nm) before charge injection; (b) Topographic image and (d) EFM image changed after charge injection (at the point marked by the arrow) at V_{INJ} = -1 V for 20 s.

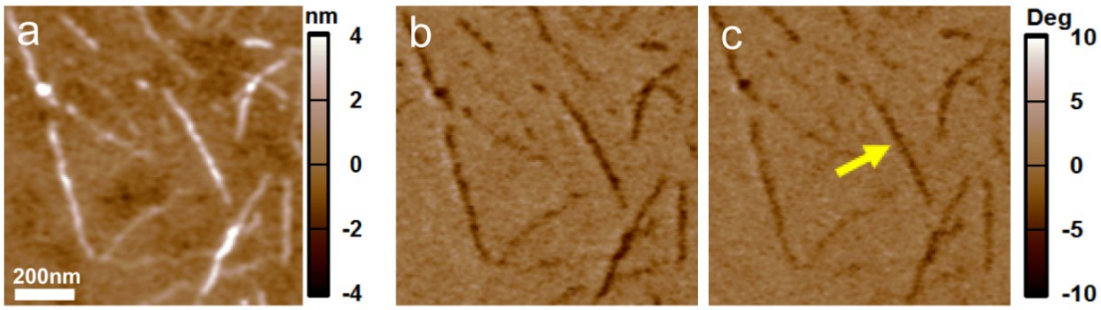

Figure S7. The topography and EFM images of P3HT fibrils on Si/SiO2 by applying a positive voltage. (a) Topographic image; (b) EFM image (phase shift, V_{EFM} = 4 V, z = 50 nm) before charge injection; (c) EFM image unchanged after charge injection (at the point marked by the arrow) at V_{INJ} = 3 V for 200 s.