Supporting Information

Micellar poly(styrene-b-4-vinylpyridine)-nanoparticle hybrid system for non-volatile organic transistor memory

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Figure S1. (a) Output characteristics (I_D versus V_D) of pentacene based OFET utilizing pure PS-*b*-P4VP/SiO_2 dielectric stack. The gate voltage varies between 0V to -40V in steps of 5V. The inset shows the schematic cross-section of the pentacene OFET with PS-*b*-P4VP/SiO_2 dielectric stack. (b) Double sweeping semilog plots of I_D-V_G transfer characteristics of the same pentacene reference transistor. The drain/source voltage (V_{DS}) is -10V. The channel length and width of the transistor are 100 μm and 1000 μm respectively.

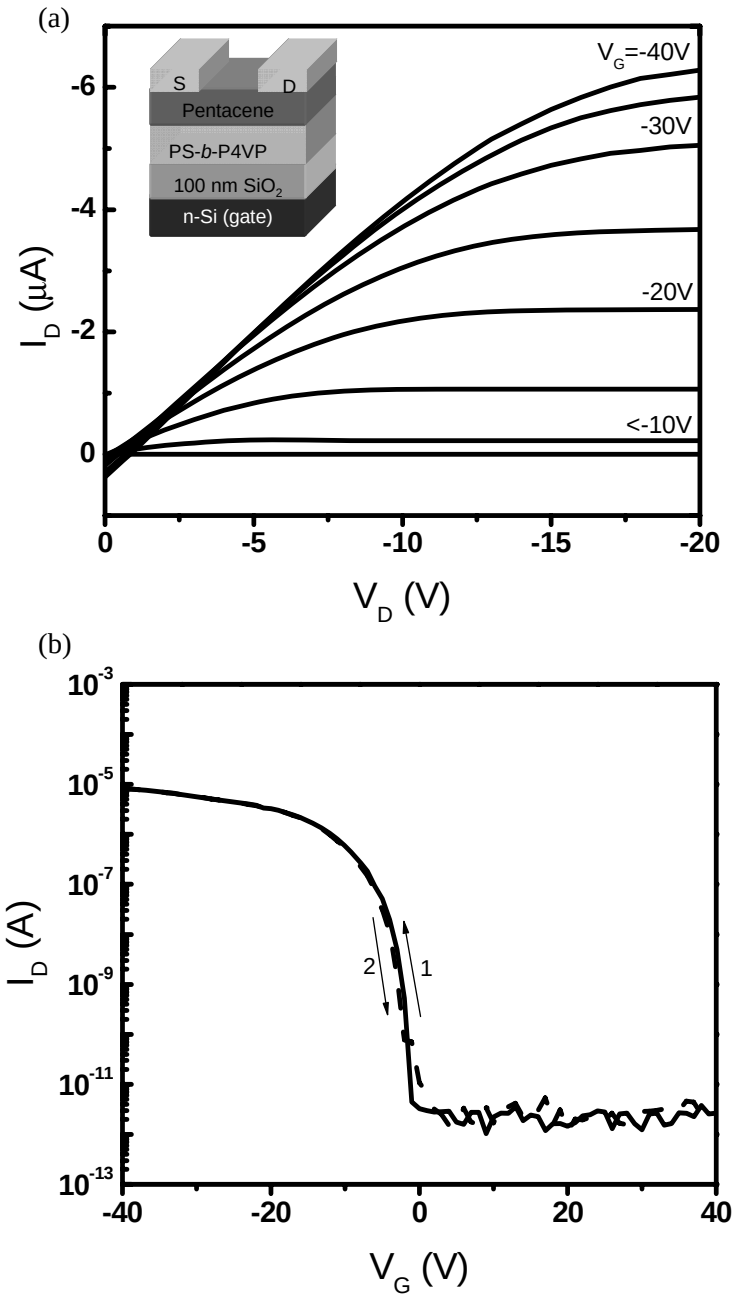

Figure S2. (a) Output characteristics (I_D versus V_D) of F_{16}CuPc OFET transistor utilizing pure PS-*b*-PVP/SiO2 dielectric stack. The gate voltage varies between 0V to 20V in steps of 5V. (b) Double sweeping semilog plots of I_D-V_G transfer characteristics of the same F_{16}CuPc reference transistor. The drain voltage is at +5V. The channel length and width is 75 μm and 4000 μm respectively. The inset shows the schematic cross-section of the F_{16}CuPc OFET with PS-*b*-P4VP/SiO_2 dielectric stack.

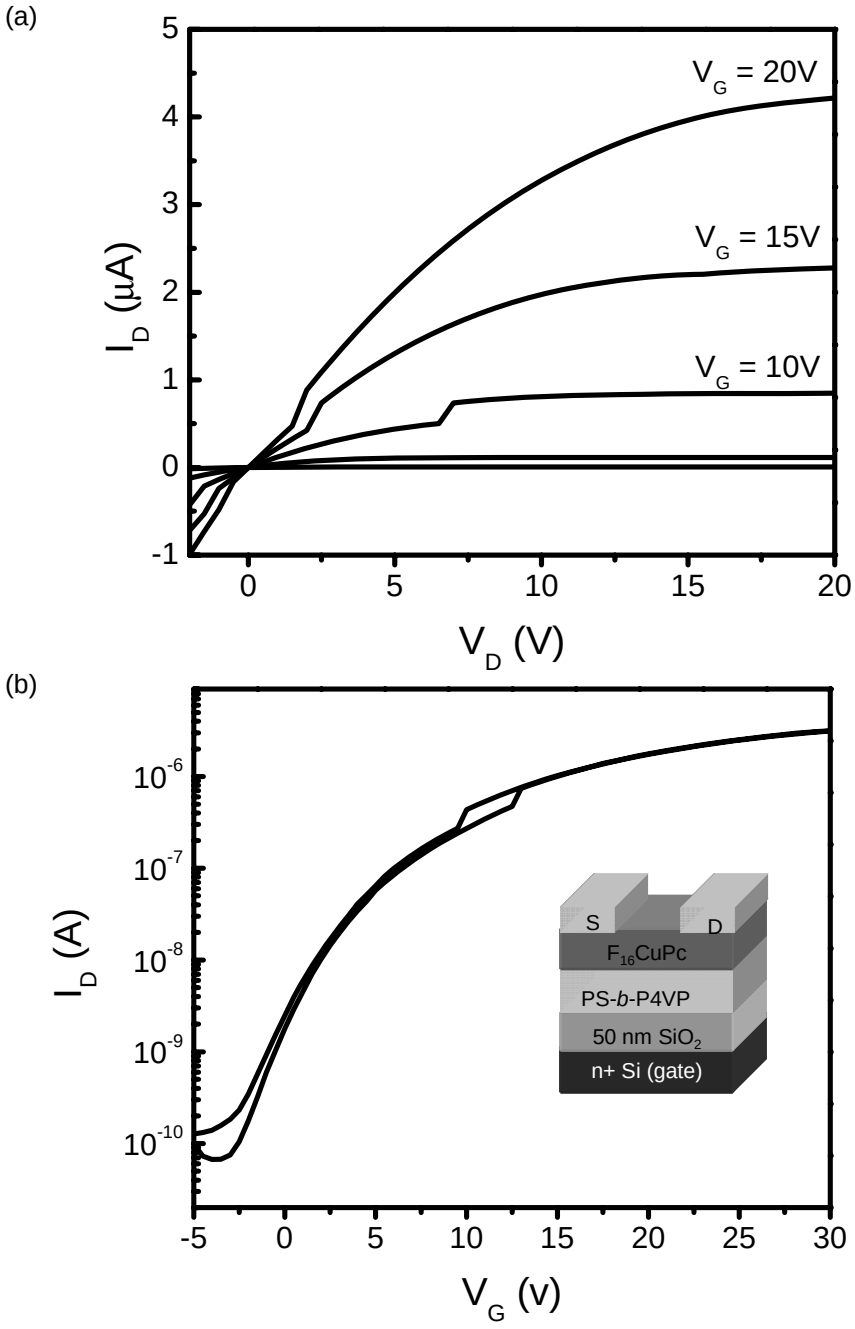

Figure S3. Corresponding gate leakage currents in transfer characteristics obtained after different gate pulse conditions for (a) pentacene OFET memory with channel length of 100 μm and width of 1000 μm. The drain voltage, V_D, is -10V. Programming: V_G = -30 V was applied for 1s and erasing: V_G = +100V was applied for 30s. (b) F_{16}CuPc OFET memory with channel length of 150 μm and width of 500 μm. V_D is 5V. Programming: V_G = +40 V was applied for 5s and erasing: V_G = -40V was applied for 5s. V_D = 0V during all programming and erasing operations.

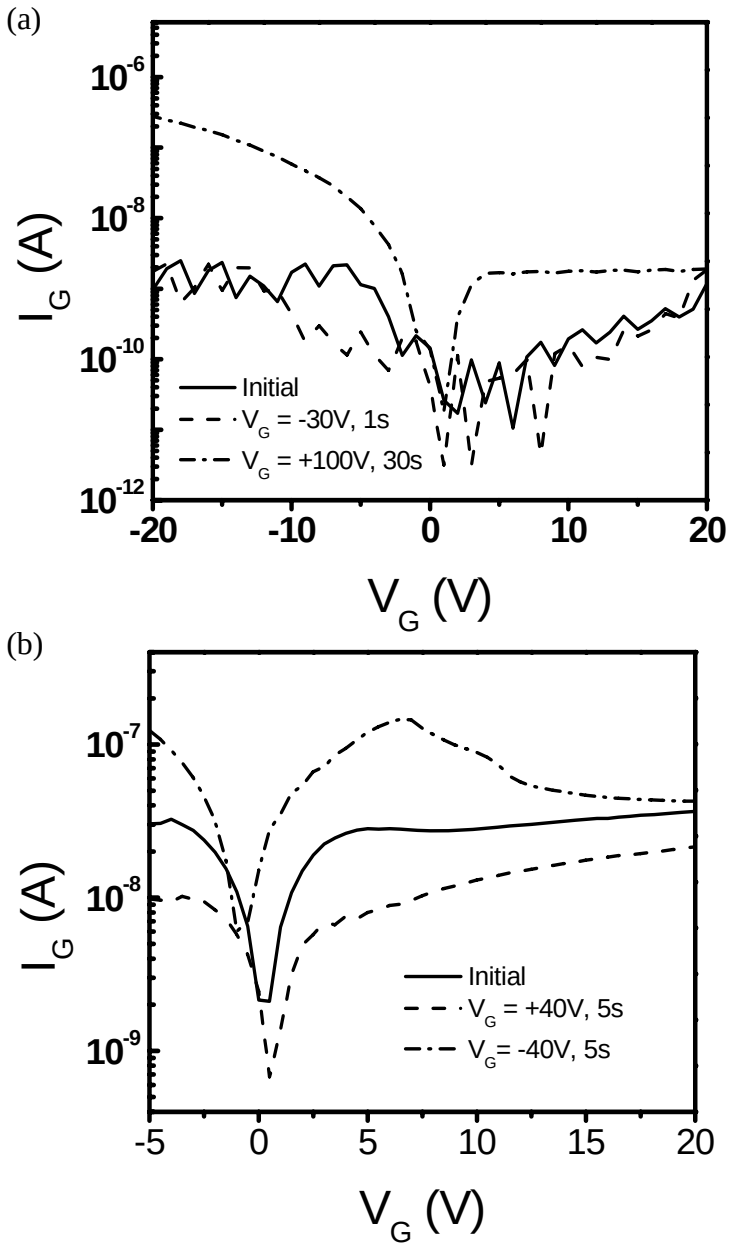

Figure S4. Semilog plots of transconductance characteristics of a pentacene OFET memory device, measured at a fixed V_D = -20V in the dark, after programming operation (red line, V_G = -25V for 1s) and after illumination of the device with white light (intensity = 75 mW/cm^2) for 30 seconds. During illumination, a positive gate voltage of +20V and +40V is applied.