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Article

Organic Field-Effect Transistor Memory Device Based on an Integrated Carbon Quantum Dots/Polyvinyl Pyrrolidone Hybrid Nanolayer

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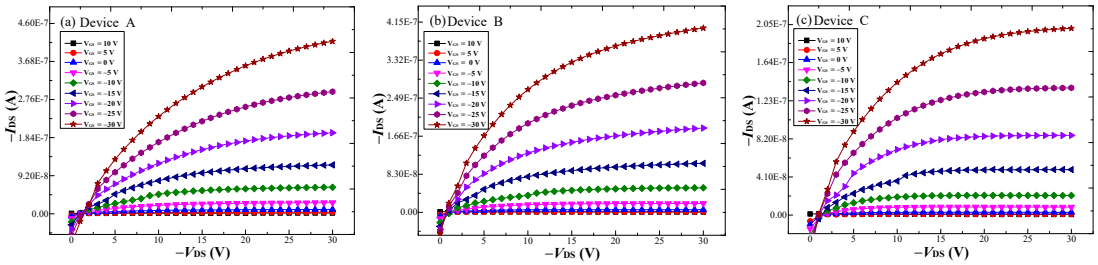

Figure S1. Output characteristics of devices A, B, and C.

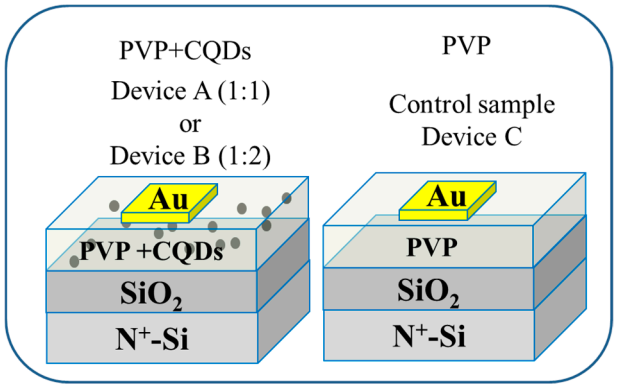

Figure S2. Device structure to measure the C_i of the bilayer insulator capacitance.

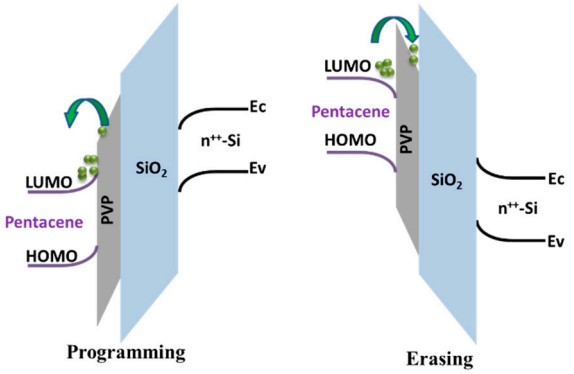

Figure S3. Energy band diagrams of device C during programming and erasing operation.

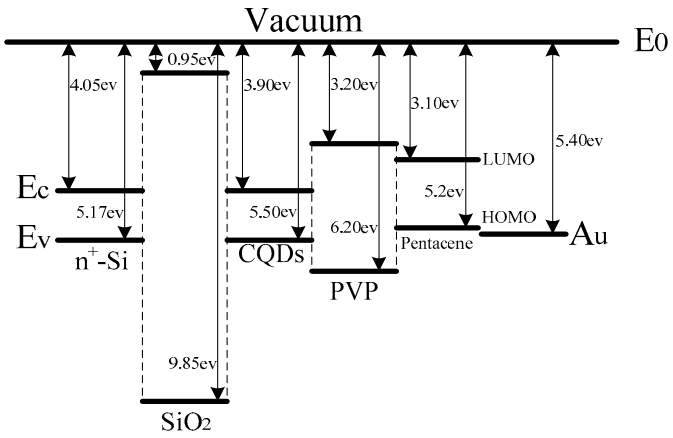

Figure S4. Energy level diagram of devices A and B without applying voltage.

The memory windows are measured as follow (take device A as an example):

(1) Scanning the initial transfer characteristic curve of the device A;

(2) The negative gate programming (P) voltage (V_P) −60 V for 0.1 s is applied to the device A. Scanning the transfer characteristic curve of the device A after P operation.

(3) The positive gate erasing (E) voltage (V_E) +60 V for 0.1 s is applied to the device A. Scanning the transfer characteristic curve of the device A after E operation.

(4) Repeat process (3) twice, the obtained two transfer characteristic curves are corresponding to the V_E = +60 V for 0.2 s and V_E = +60 V for 0.3 s.

(5) The V_{DS} is kept at 0 V throughout the P/E operation. The transfer characteristic curves V_T shifts between the P/E operation is defined as the memory window of the device.

(6) As a result, a memory window of approximately 8.41 V was obtained for device A at V_P = −60 V for 0.1 s and V_E = +60 V for 0.3 s.