Supplementary Information

Functionalization of Violet Phosphorus Quantum Dots with Azo-Containing Star-Shape Polymer for Optically Controllable Memory

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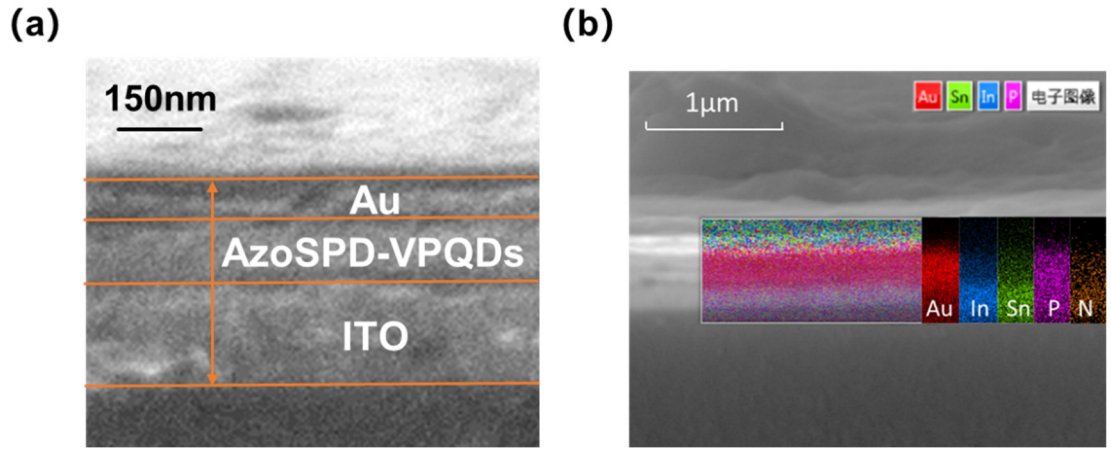

Figure S1. (a) The SEM characterization of the device is ITO, AzoSPD-VPQDs, and Au, with thicknesses of 180,120, and 80 nm, respectively. (b) EDS analysis under SEM characterization.

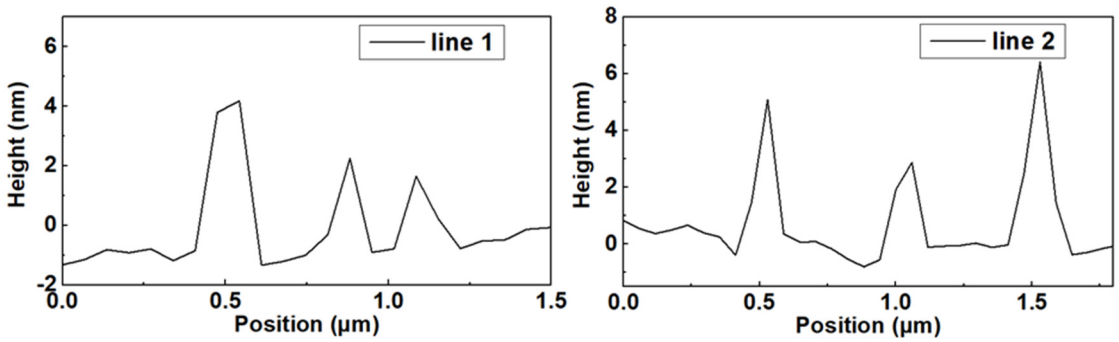

Figure S2. The height distribution map of the AFM along the two lines.

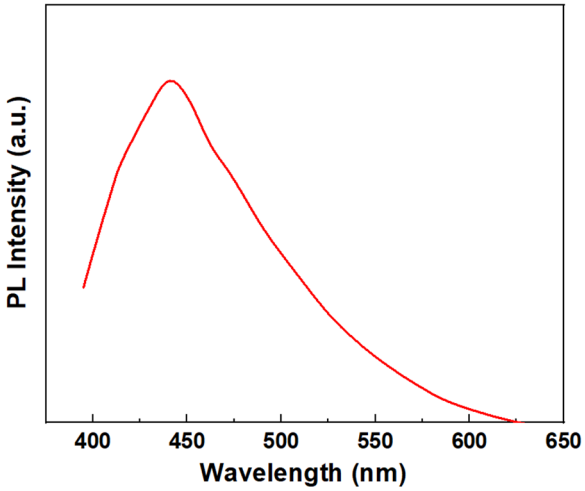

Figure S3. The fluorescence emission spectrum of the AzoSPD-VPQDs solution at 360 nm excitation.

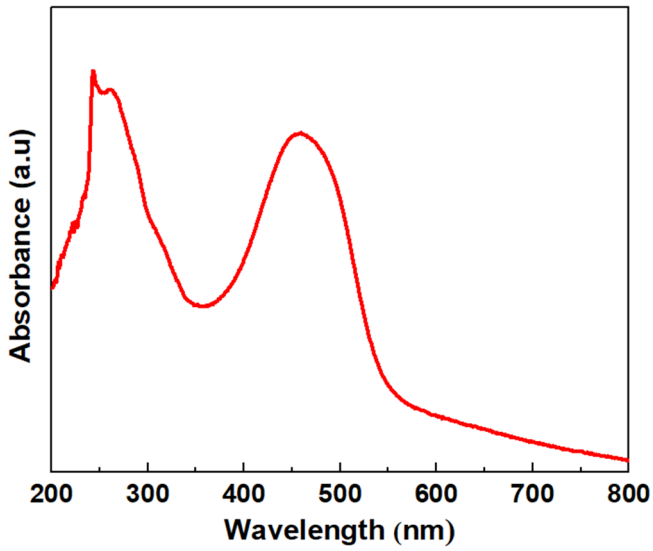

Figure S4. UV-Vis spectrum of AzoSPD in the range of 200 ~ 800 nm.

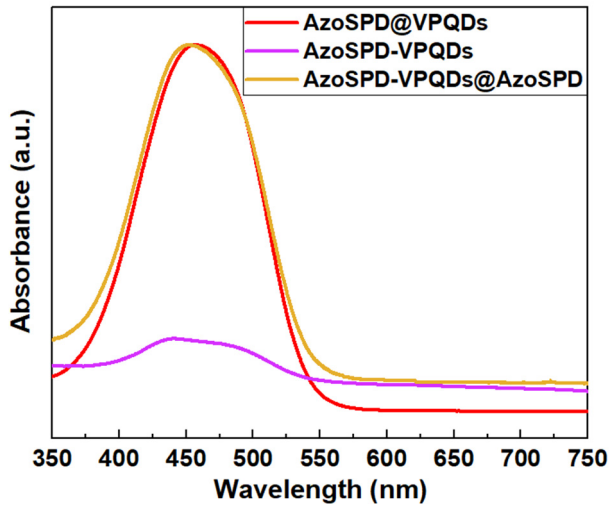

Figure S5. UV-Vis contrast diagram of chemical modification and physical mixing. Where '@' represents physical mixing and '-' represents chemical bonding.

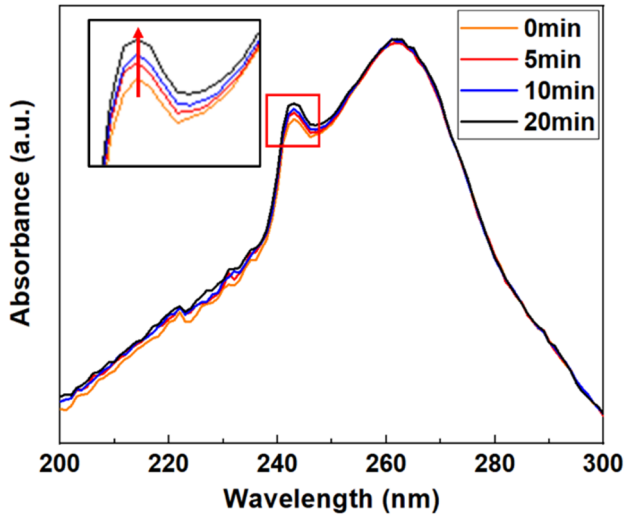

Figure S6. The UV-Vis absorption peak intensity of the AzoSPD-VPQDs solution changed with the irradiation time under 465 nm light irradiation (200 ~ 250 nm).

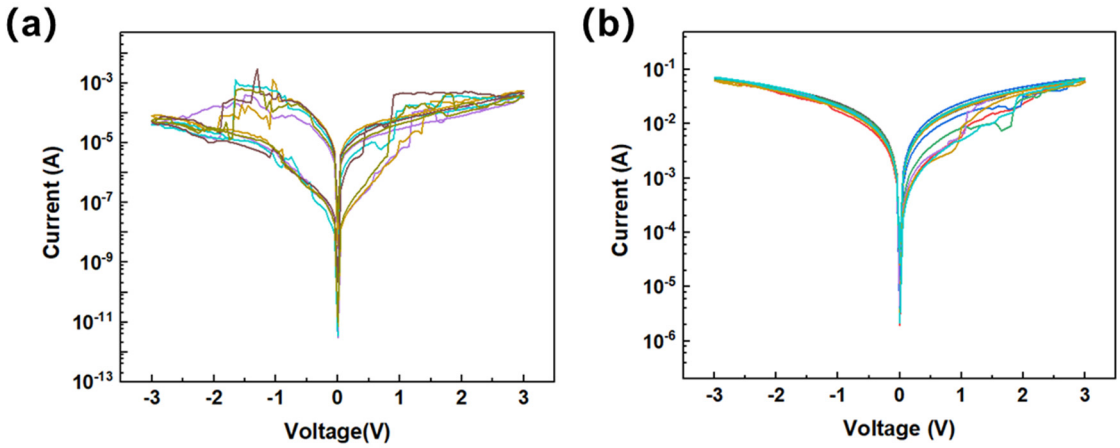

Figure S7. The memristive characteristic curve of the control group, (a) Au/AzoSPD/ITO structure device; (b) Au/VPQDs/ITO structure device.

Table S1. The performance of this work compared with some QDs memristors.

Device Structure	SET/RESET Voltage [V]	Switching Ratio	Endurance (Loop)	Switching Power (W)	Multimodal Control
Au/PDDF-g-BP/ITO[1]	-2.34/1.95	10^4	600	10^{-10}~10^{-2}	No
Ag/GQDs:GO/ITO[2]	-0.43/0.43	$>10^3$	>500	10^{-5}~10^{-2}	No
BPQDs/PVA[3]	-4/4	122	-	10^{-5}~10^{-3}	Temperature and humidity
Ag/(InP/ZnS) QDs/ITO[4]	-0.86/1.27	1.85×10^2	-	10^{-6}~10^{-4}	UV light
Ag/N-GOQDs/Pt[5]	-0.1/0.22	10^7	50	10^{-10}~10^{-3}	Alternating current
Ag/N-GOQDs/Pt[6]	-/0.25	10^6	30	10^{-10}~10^{-4}	UV light
Au/AzoSPD-VPQDs/ITO (This work)	-1.52/1.75	2×10^3	90	10^{-8}~10^{-5}	UV light

Reference

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