Supplementary Information

Multifunctional additive enables lead-adsorbing carbon electrodes for perovskite solar cells

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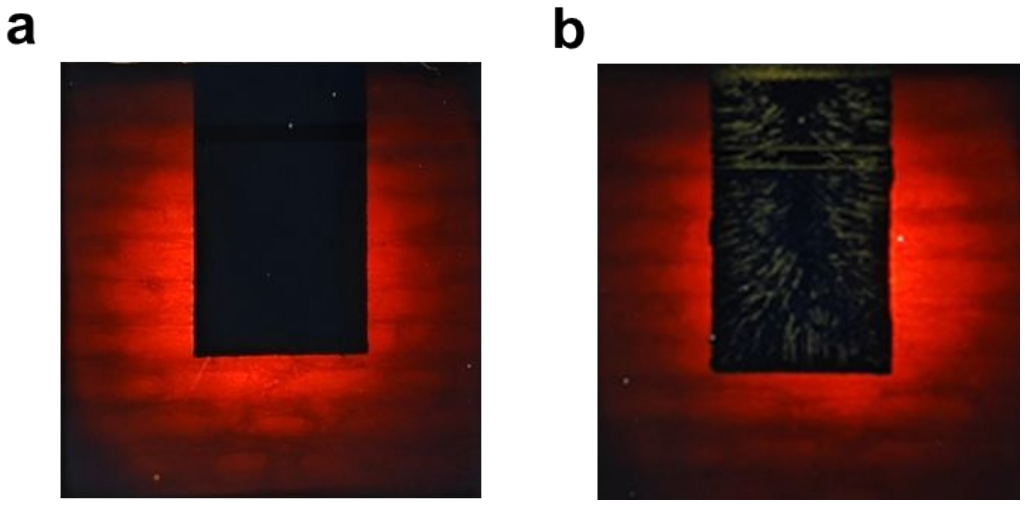

Figure S1 Photograph of backside of PSCs devices with p-PG deposited on. (a) Undamaged. (b)Damaged.

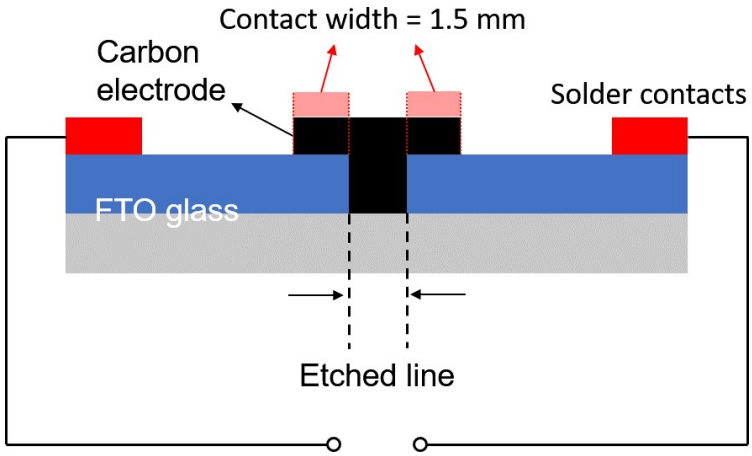

Figure S2 Schematic diagram for FTO/carbon electrode contacts resistance measurement.

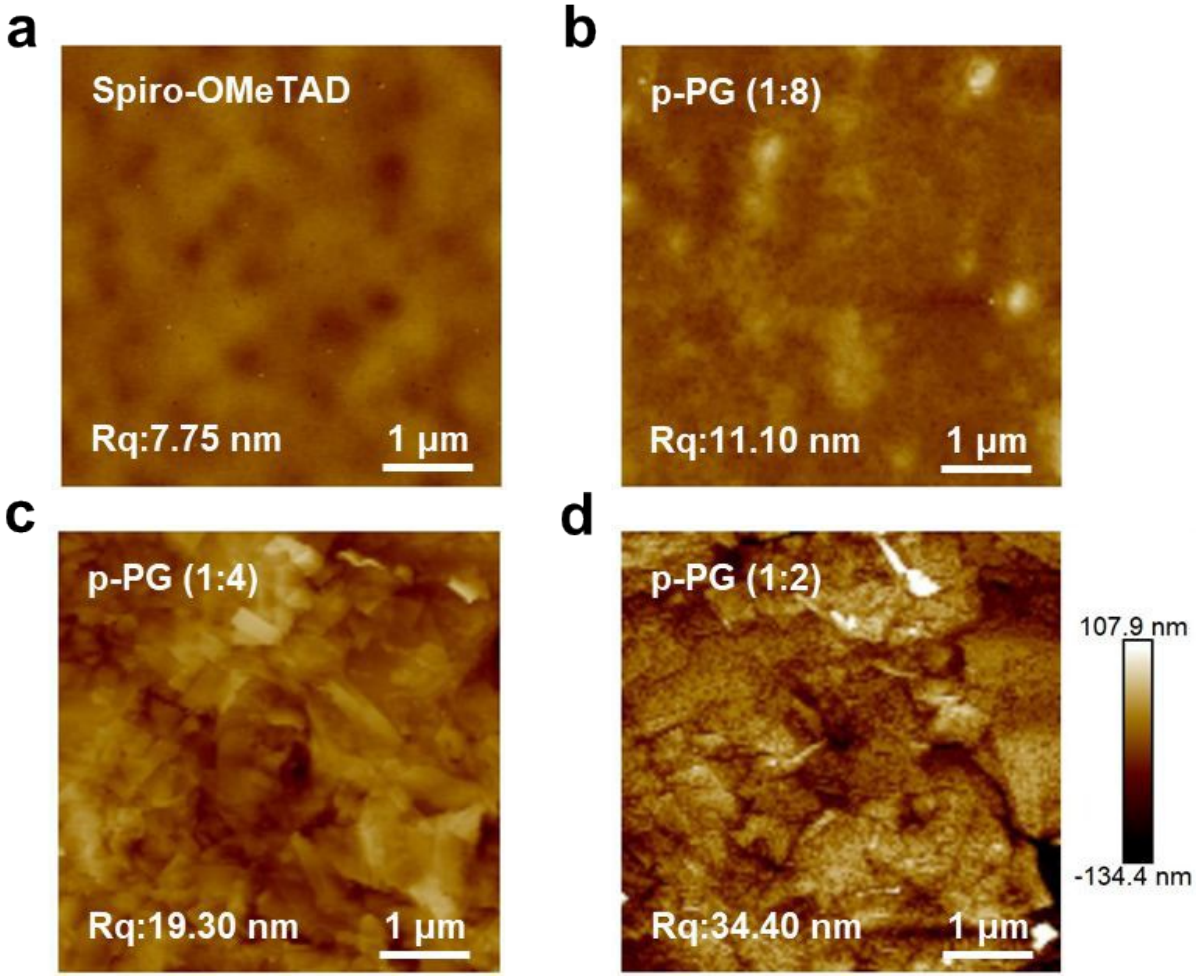

Figure S3 Atomic force microscope images of (a) Spiro-OMeTAD and (b-d) p-PG on semi-devices.

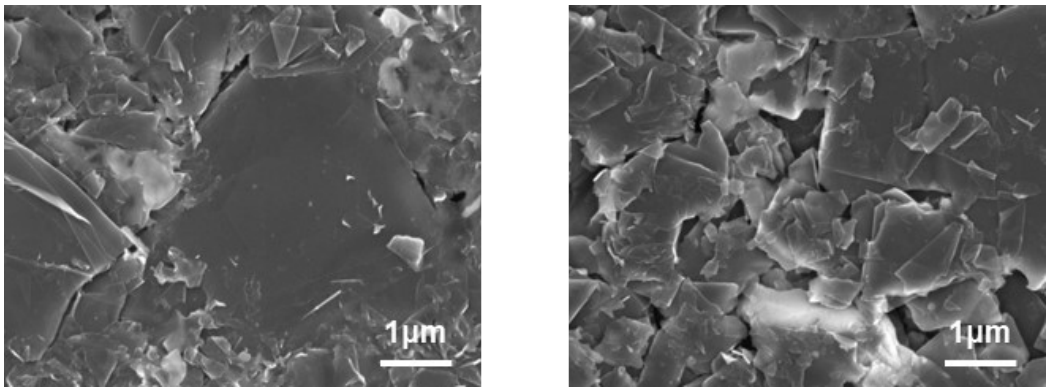

Figure S4 Top view SEM images of p-PG with sodium dihydrogen phosphate crystals

Figure S5 The steady-state output current and calculated PCE of the champion p-PG (1:8) based device.

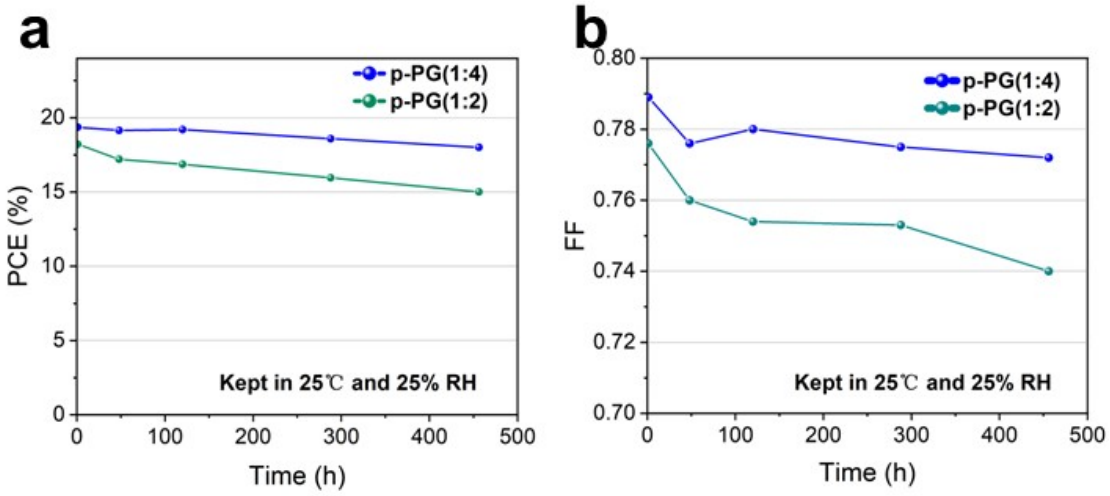

Figure S6 Storage stability of p-PG(1:4) and p-PG(1:2) based device.

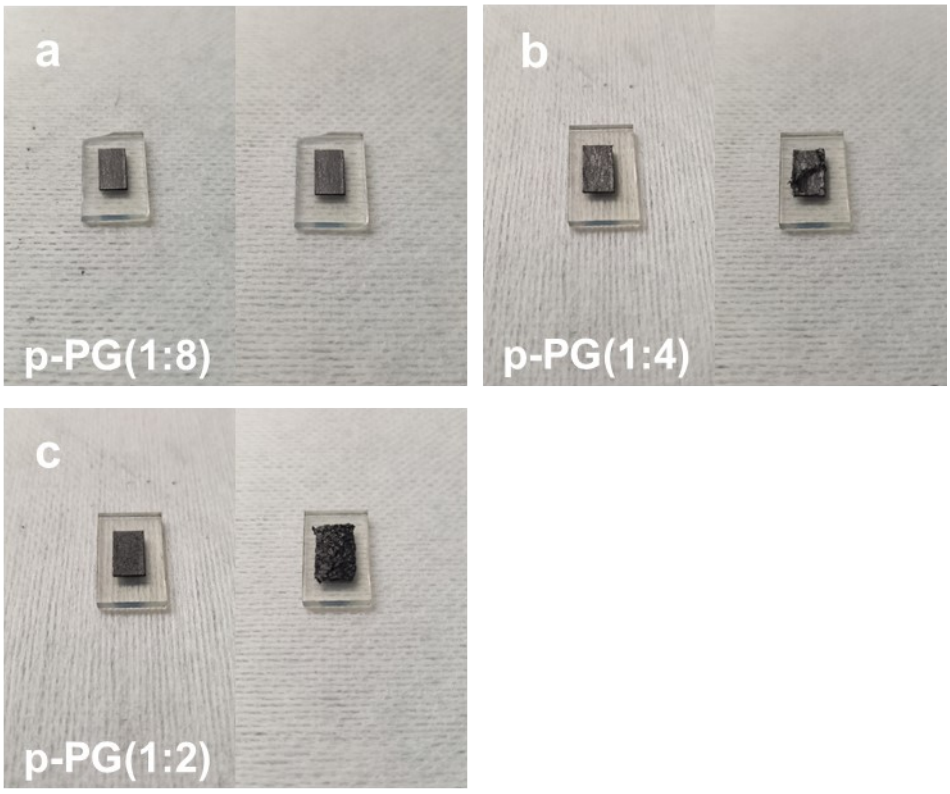

Figure S7 Photographs of p-PG with different mixing ratios before and after moisture absorption in the same humidity environment.

Figure S8 Photographs of damaged devices in lead leakage test.

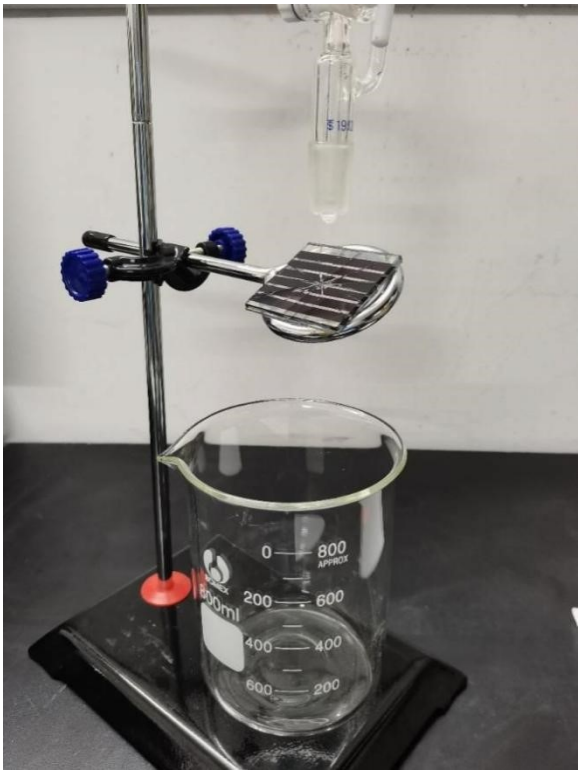

Figure S9 Photograph of water-dripping test equipment setup.

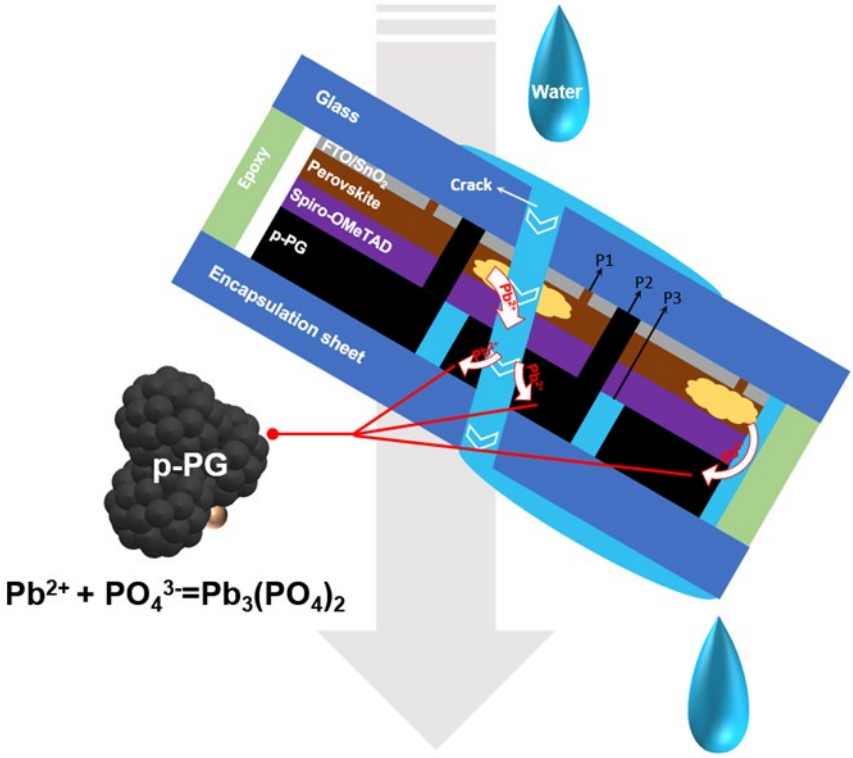

Figure S10 Schematic diagram of the gravitational-driven directional flow of effluent enhances the adsorption efficiency of Pb2+ onto carbon electrodes.