Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information

Stable and efficient soft perovskite crystalline film based solar cells with a facile encapsulation method

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Optical layout of the reflectance spectrometer

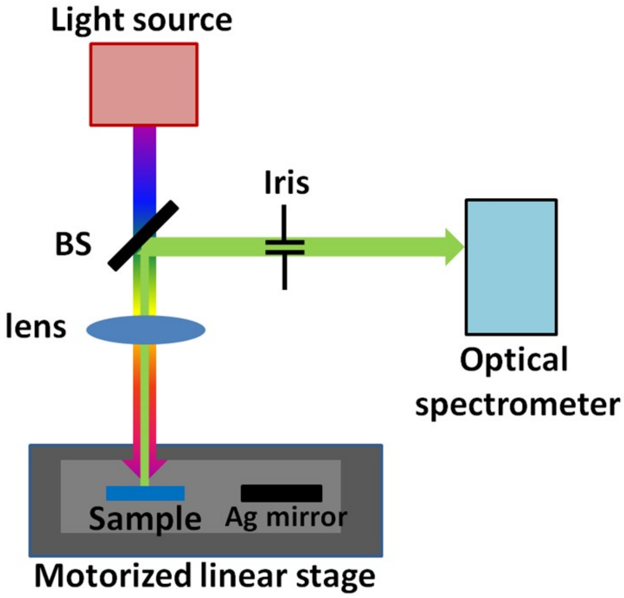

Fig. S1. Optical layout of the reflectance spectrometer. The light source (SLS301, Thorlabs) emits a broadband spectrum (360 nm – 3800 nm). The beam splitter (BS) is used to collect the reflected beam from the sample (or Ag mirror). The lens is used to collimate the light source. The Ag mirror is used as the reference of the reflectance spectrum. The Ag mirror and sample are mounted on a motorized linear stage with two mirror mounts. The iris is used to reduce the optical noise. The optical spectrometer (Mars TB3000+, GIE) is used to measure the spectrum of the reflected beam.

Day-dependent R_S of the inverted perovskite solar cells

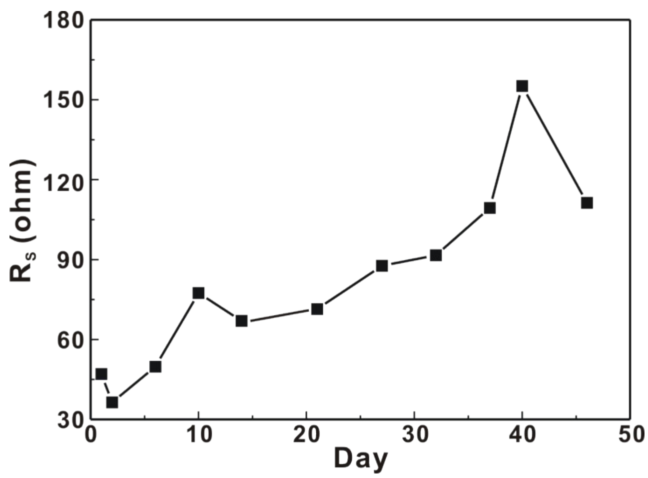

Fig. S2. Day-dependent series resistance (Rs) of the inverted perovskite solar cells. The sample was encapsulated on the second day.

Schematic diagram of the $MAPbI_3$/P3CT-Na/ITO tri-layer structure

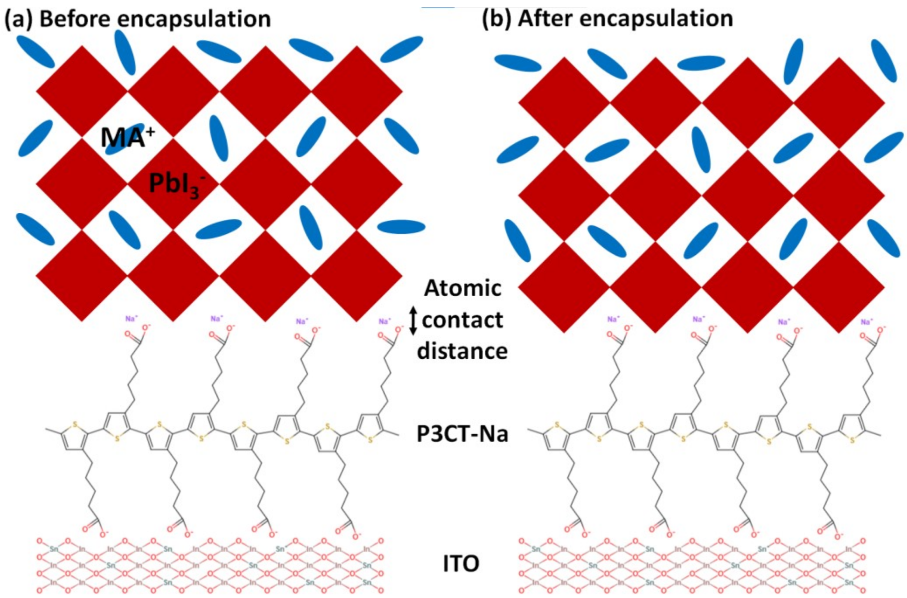

Fig. S3. Schematic diagrams of the $MAPbI_3$/P3CT-Na/ITO tri-layer structure with the different atomic contact distances.

Day-dependent PCE of the inverted $MAPbI_3$ solar cells with and without the encapsulation method

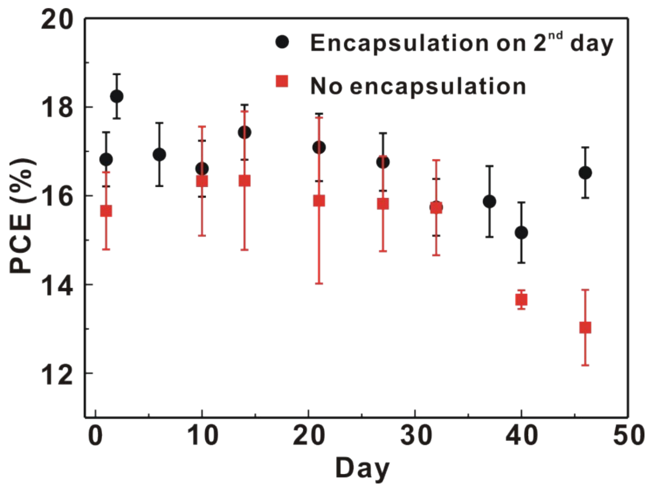

Fig. S4. Day-dependent PCE of the inverted $MAPbI_3$ solar cells with and without the facile encapsulation method.

Atomic-force microscopic images

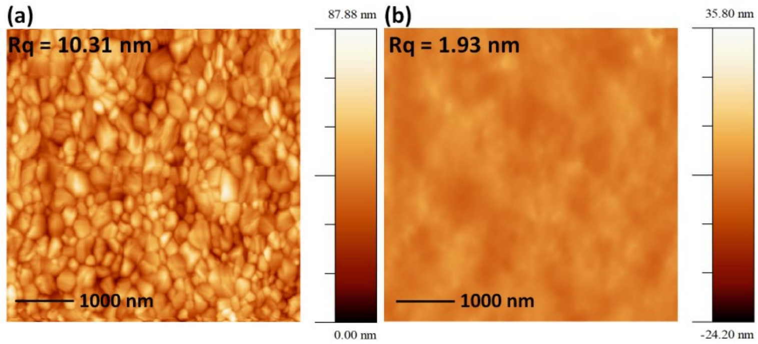

Fig. S5. Atomic-force microscopic images. (a) $MAPbI_3$/P3CT-Na/ITO/glass; (b) BCP:PCBM/$MAPbI_3$/P3CT-Na/ITO/glass.

X-ray diffraction patterns

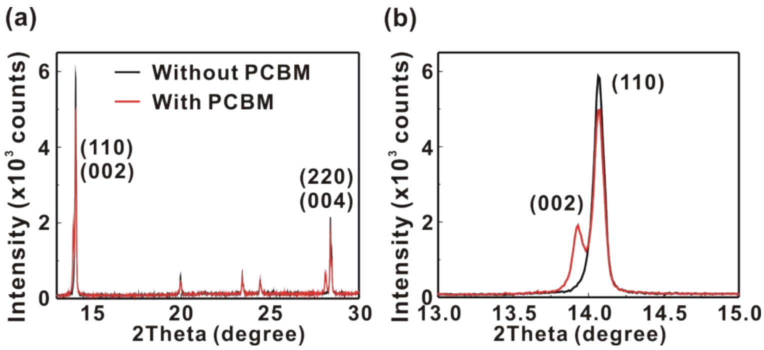

Fig. S6. X-ray diffraction patterns of the $MAPbI_3$/P3CT-Na/ITO/glass and BCP:PCBM/$MAPbI_3$/P3CT-Na/ITO/glass samples.