**Supplementary Material**

**Effect of Excessive Pb on the Stability and Performance of Pb-Halide Perovskite Solar Cells Against Photo-Induced Degradation**

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Fig S1. Photo-degradation of photo-voltaic properties of PVS device with illumination time(T),

1. Normalized Jsc-T curve, (b) Voc-T curve, (c) FF-T curve



Fig. S2. UV-Vis spectra from Sample A, Sample B, and Sample C



Fig. S3. SEM Images of PVS before and after illumination, (a) Sample A-i, (b) Sample A-d, (c) Sample B-i, (d) Sample B-d, (e) Sample C-i, (f) Sample C-d; with suffix “*i*” in for the pristine sample and the suffix “*d*’ is after degradation