

## Supplementary Information

### Trap Passivation and Efficiency Improvement of Perovskite Solar Cells by a Guanidinium Additive

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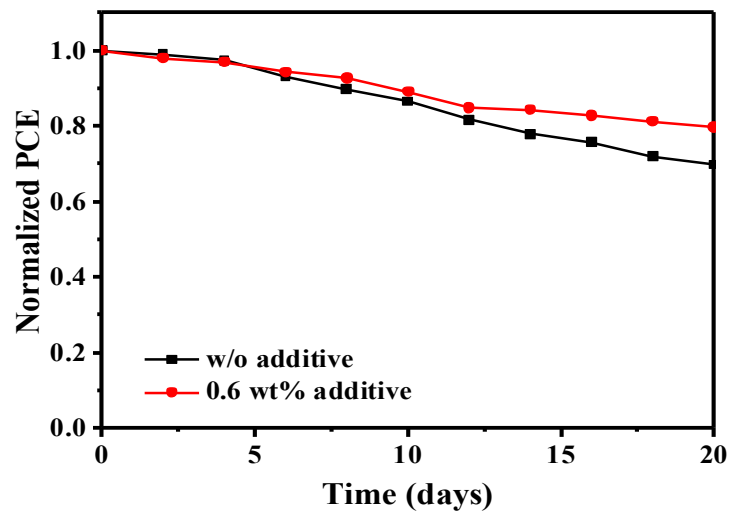


Figure S1. The storage life time of devices without and with 0.6 wt% DAGCl additive.

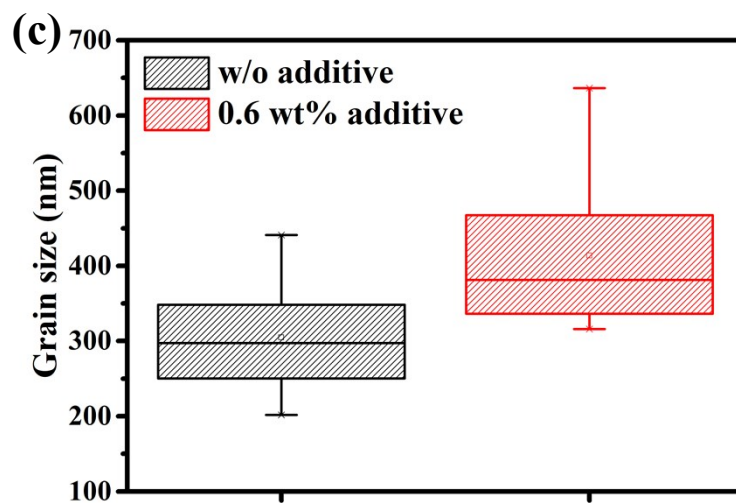
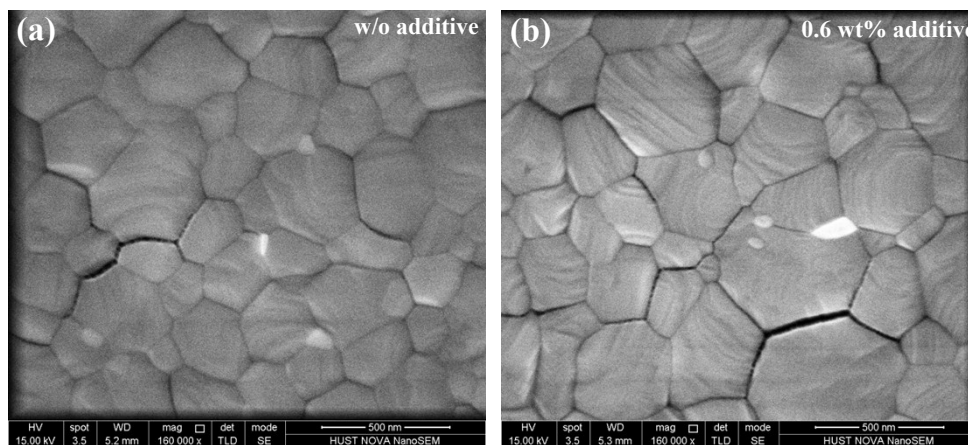


Figure S2 (a,b) Surface-view SEM images of perovskite films without and with the optimized concentration of DAGCl additive. c) The statistic plot of grains size based on images a and b.

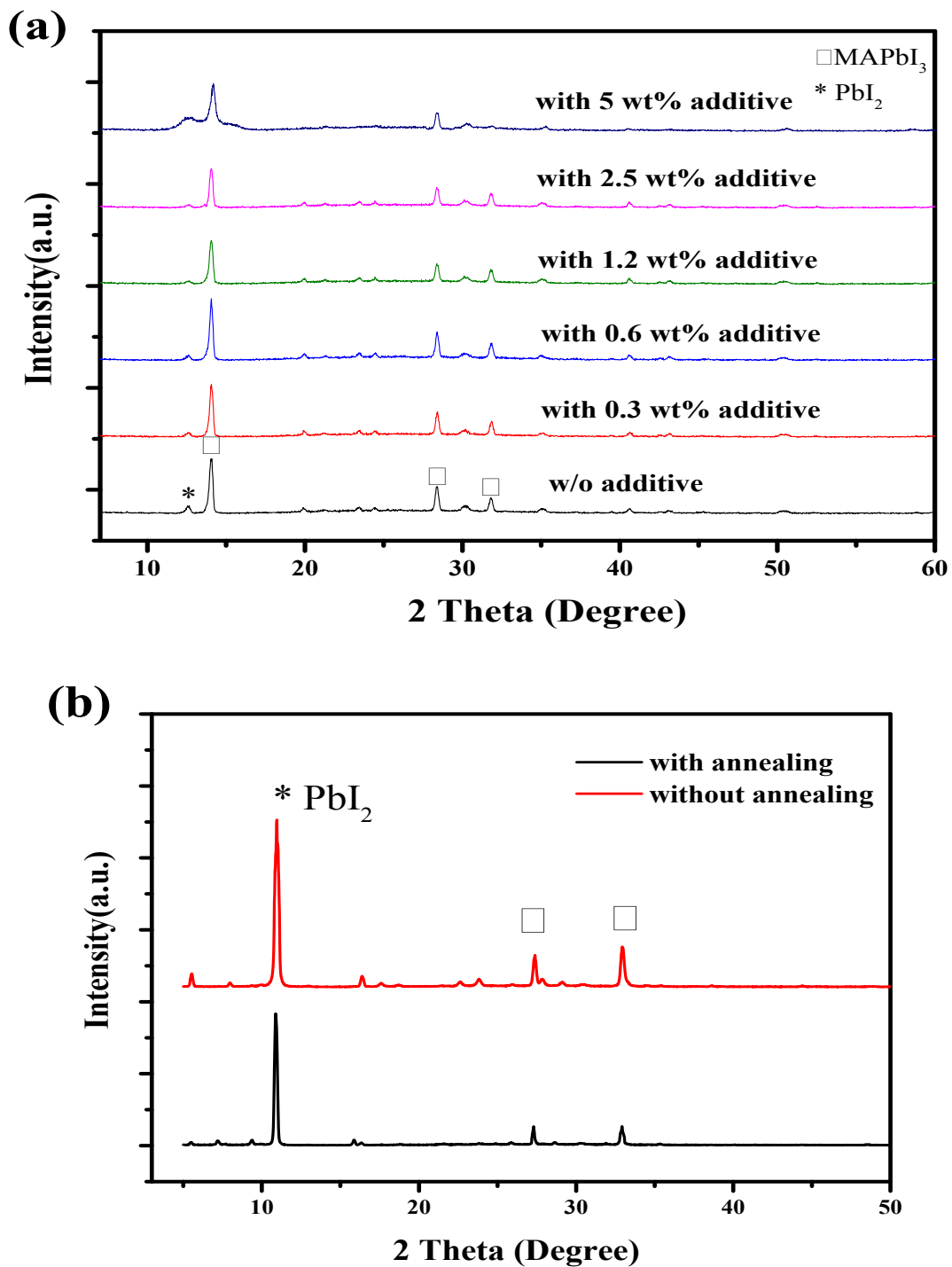


Figure S3. (a) XRD spectra of perovskite films containing different contents of DAGCl. (b) XRD spectra of films cast from precursors containing DAGCl and PbI<sub>2</sub>.

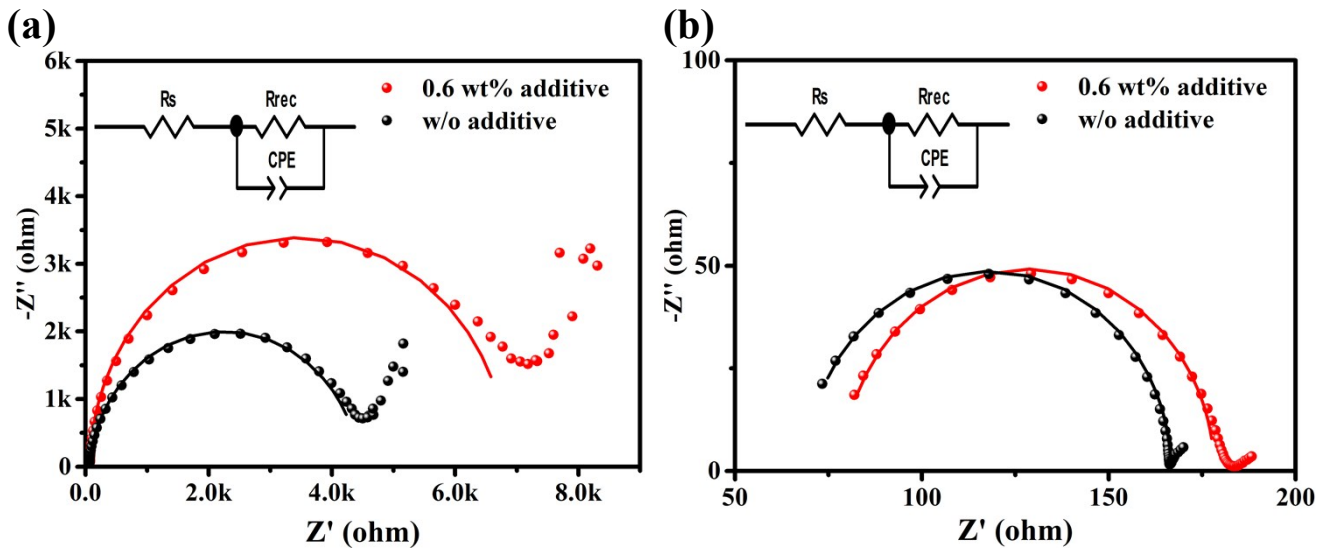
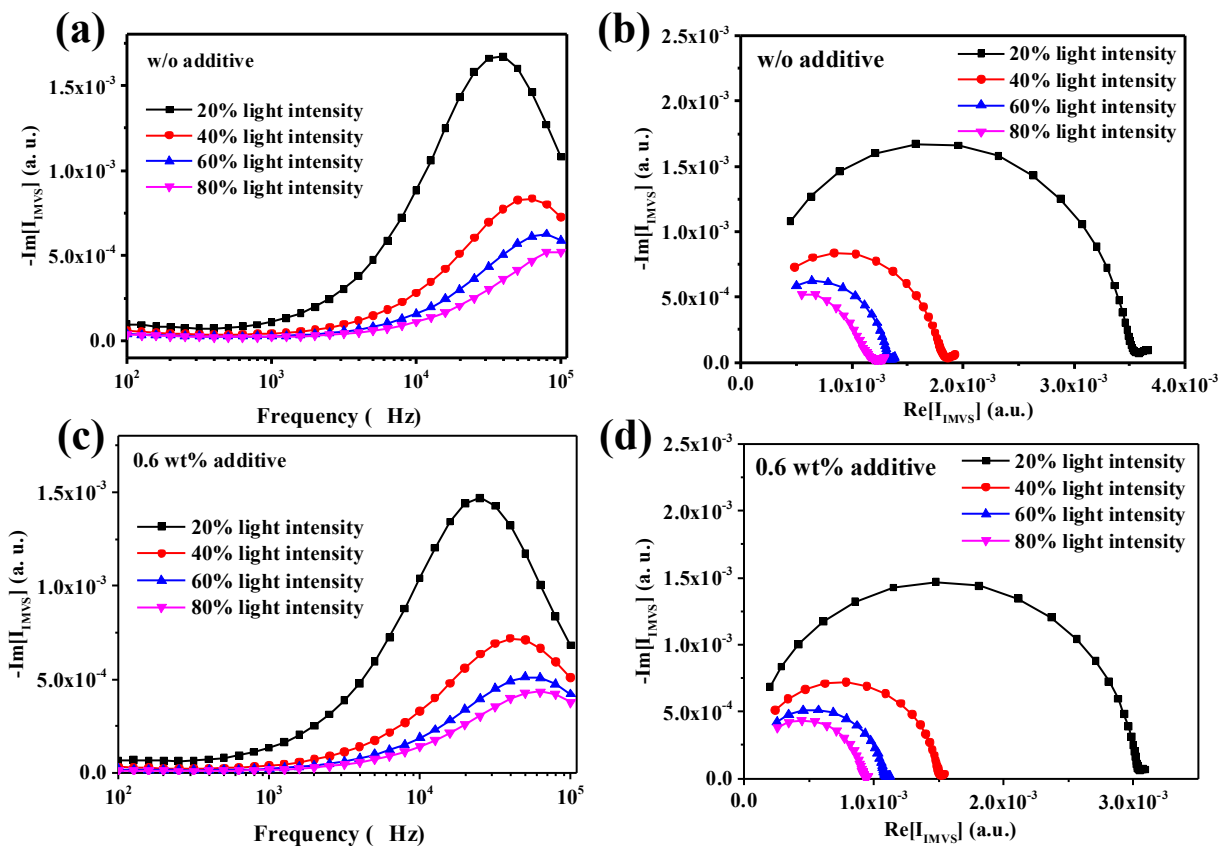


Figure S4. (a) and (b) EIS measurements by applying a low voltage (0.2 v) and high voltage (1.0 v), under 1-sun illumination, without and with the optimized concentration of DAGCl additive.



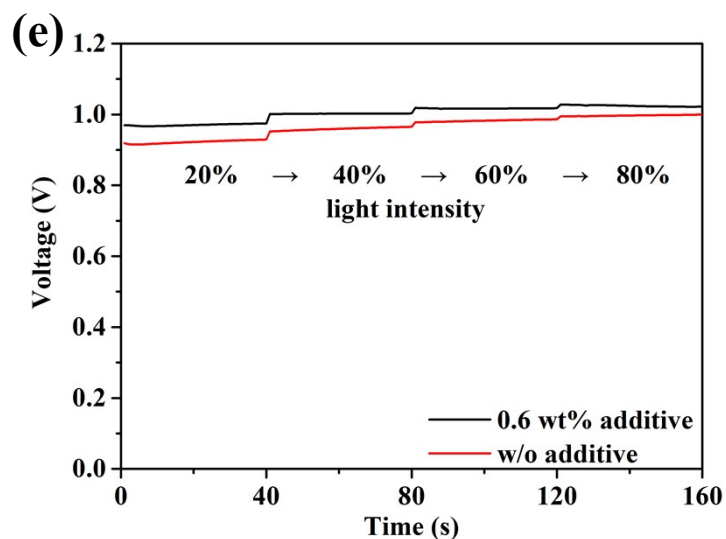


Figure S5. Bode plot and Nyquist plot of PSC without additive (a, b) and with 0.6 wt% DAGCl (c, d) from IMVS testing, respectively. e) The voltage changes at different light intensity during an IMVS test.

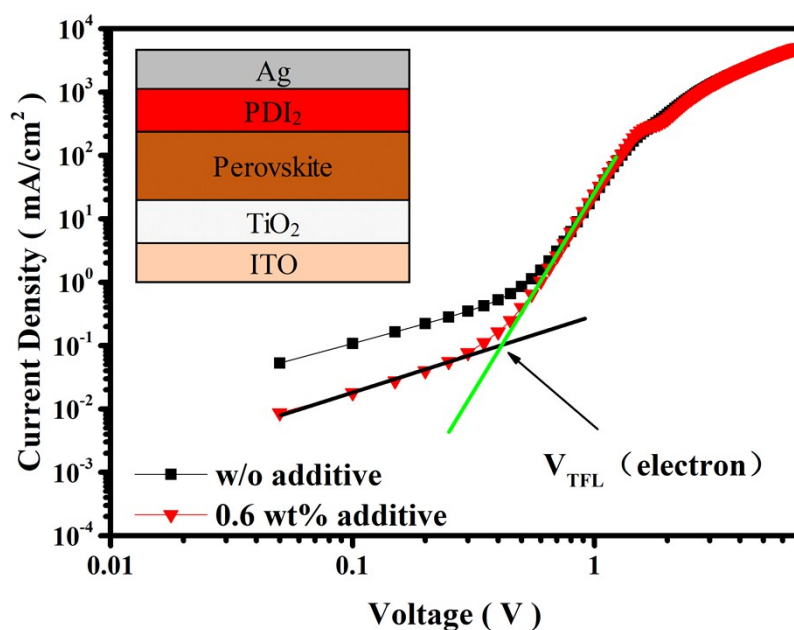


Figure S6. Dark current–voltage curves of electron-only devices employing an n-type semiconductor PDI<sub>2</sub> to replace PCBM.