

Supplementary Information

Influence of A-Site Cation on the Open-Circuit Voltage of Efficient Perovskite Solar Cells: A case of Rubidium and Guanidinium Additives

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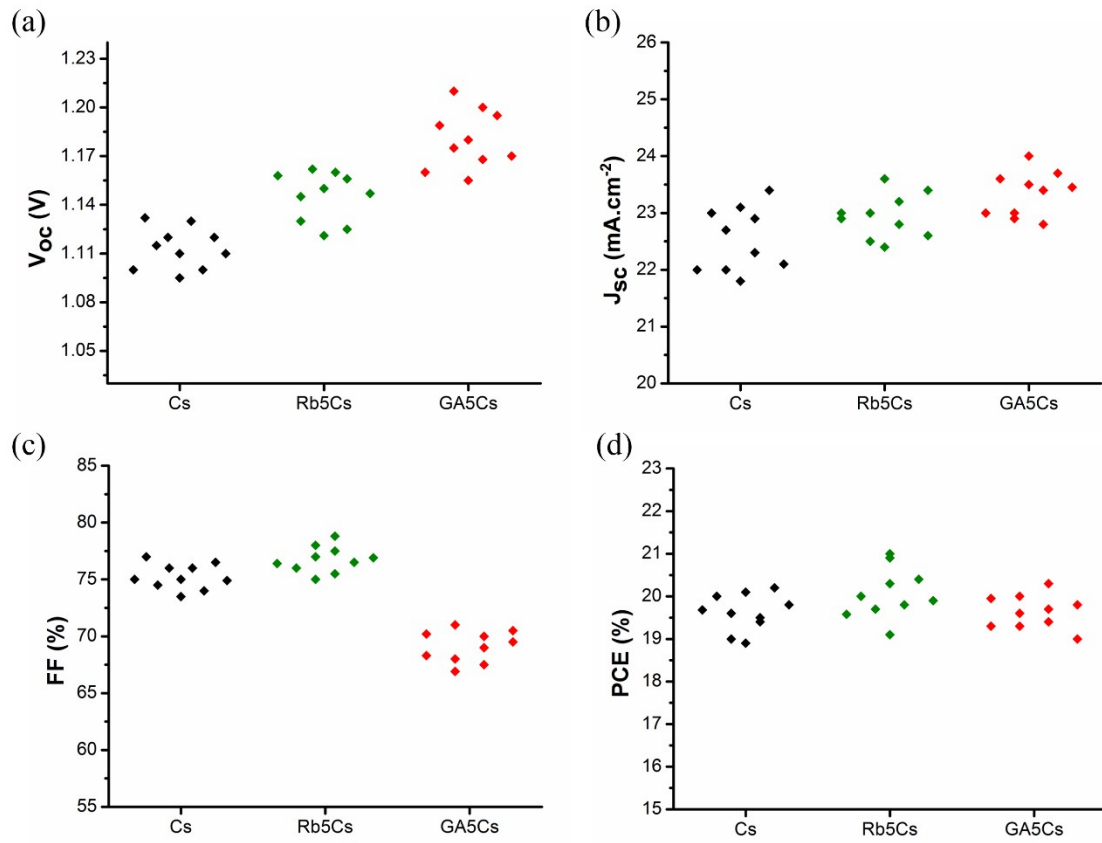


Fig. S1. Statistics of photovoltaic parameters for the Cs, Rb₅Cs, and GA₅Cs PSCs, (a) V_{oc} , (b) J_{sc} , (c) FF, and (d) PCE.

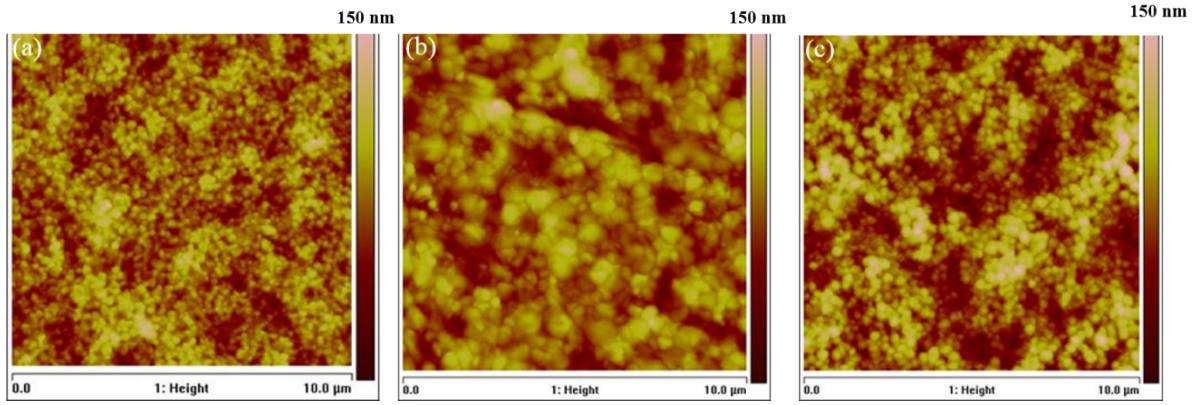


Fig. S2. AFM images of (a) Cs, (b) Rb₅Cs (c) and (d) GA₅Cs perovskite films.

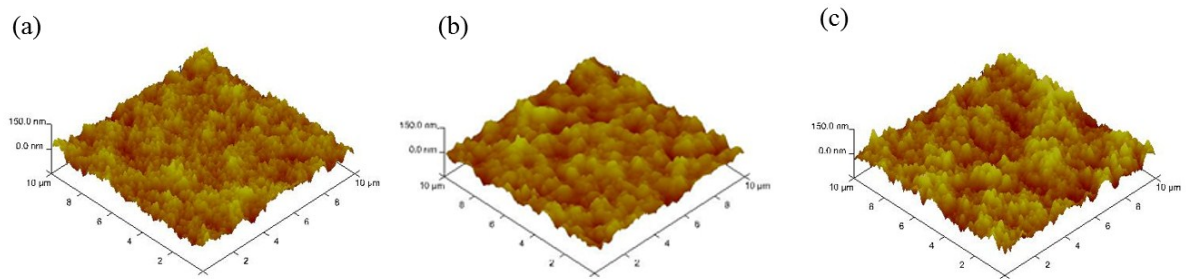


Fig. S3. Three-dimensional AFM images of (a) Cs, (b) Rb₅Cs and (c) GA₅Cs perovskites deposited on glass slide.

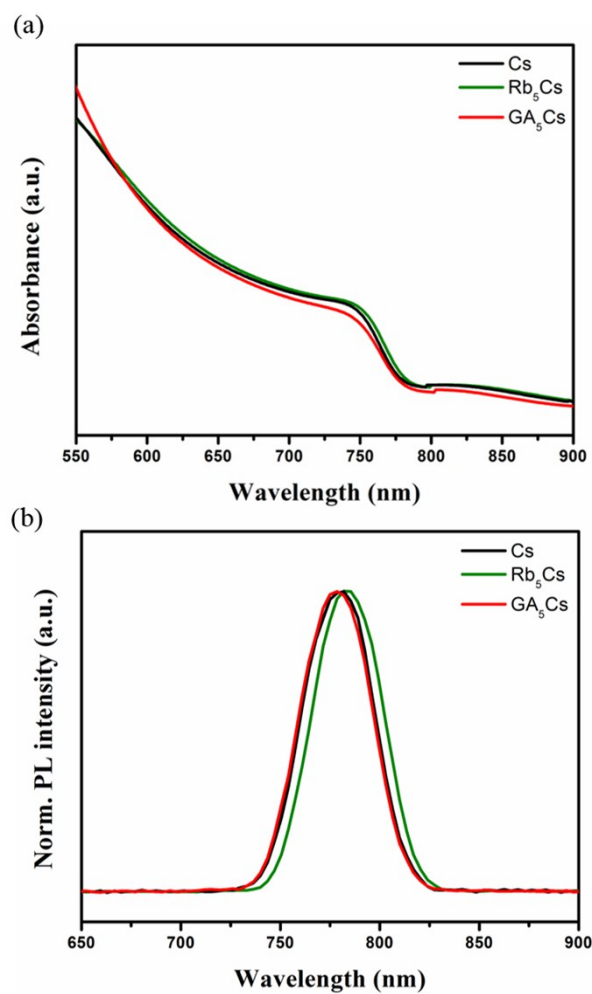


Fig. S4. UV-visible and PL spectra of Cs, Rb₅Cs and GA₅Cs perovskites deposited on glass slide.

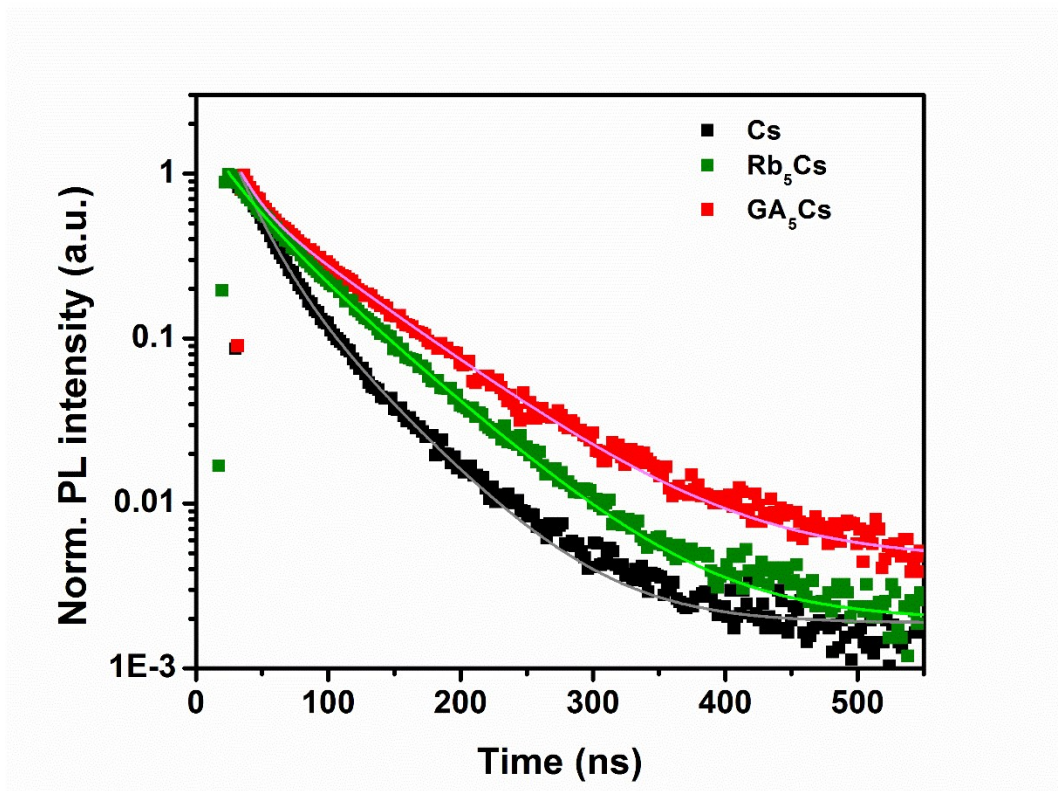


Fig. S5. Time-resolved PL (TRPL) spectra of Cs, Rb₅Cs and GA₅Cs based perovskite films deposited on glass slides.

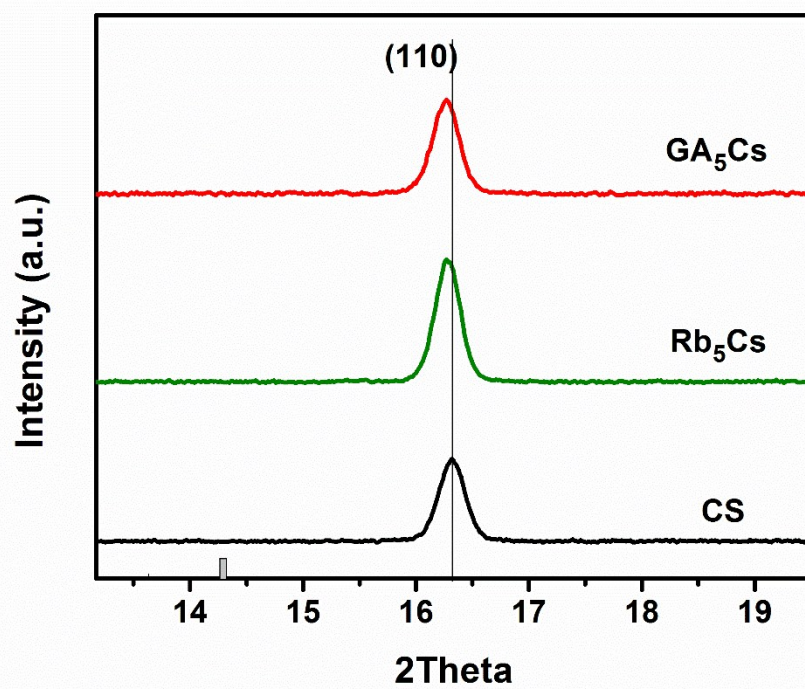


Fig. S6. XRD patterns of Cs, Rb_5Cs and GA_5Cs perovskite films, zoomed on (110) peak.

Table S1. Photovoltaic parameters of the best performing Cs, Rb₅Cs and GA₅Cs PSCs

Device	V _{oc} (V)	J _{sc} (mA/cm ²)	FF (%)	PCE (%)
Cs	1.12	22.7	76	19.7
Rb ₅ Cs	1.16	22.8	78	21
GA ₅ Cs	1.2	23.6	70	20.3

Table S2. Fitting parameters of the corresponding TRPL curves

Perovskite	A	τ (ns)
Cs	2.9	29.7
Rb ₅ Cs	1.59	49.6
GA ₅ Cs	1.6	56.5