

Supporting information...

Tri-*tert*-butyl Arylamine Zinc Phthalocyanine Derivatives as p-type Self-assembled Molecules for Efficient Perovskite Solar Cells

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Figure S 1 ¹ H-NMR of 8 in CDCl ₃	2
Figure S 2 ¹ H-NMR of 6 in CDCl ₃	2
Figure S 3 ¹ H-NMR of ZnPc-3 in THF-d ₈	3
Figure S 4 ¹ H-NMR of ZnPc-1 in THF-d ₈	3
Figure S 5 ¹ H-NMR of ZnPc-4 in THF-d ₈	4
Figure S 6 ¹ H-NMR of ZnPc-2 in THF-d ₈	4
Figure S 7. IR spectra of ZnPc -1 (blue), -2 (green), -3 (black), and -4 (red)	5
Figure S 8. HR-MALDI-TOF spectrum of ZnPc-3	5
Figure S 9. HR-MALDI-TOF spectrum of ZnPc-1	6
Figure S 10. HR-MALDI-TOF spectrum of ZnPc-4	6
Figure S 11. HR-MALDI-TOF spectrum of ZnPc-2	7
Figure S12. UV-Vis absorption spectra of glass/ITO/SAMs acquired at 300-900 nm.....	8
Figure S13. Water contact angle measurement on bare ITO.....	8
Figure S14. Grain size distribution of perovskite films deposited on top of a) EADR03, b) ZnPc-1 and c) ZnPc-2.....	9
Figure S15. Dark current-voltage curves (log-log scale) of hole-only devices based on ZnPc SAMs and EADR03.....	9
Figure S16. Box plot charts of statistical distribution of photovoltaic parameters.....	9

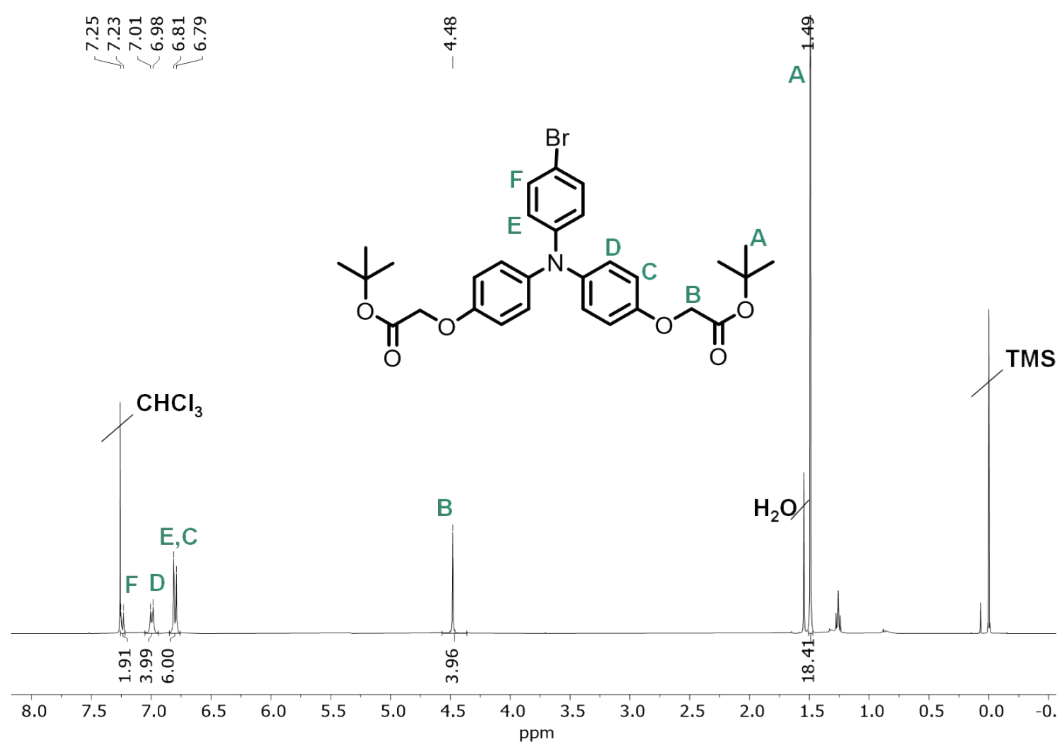


Figure S 1¹H-NMR of **8** in CDCl₃

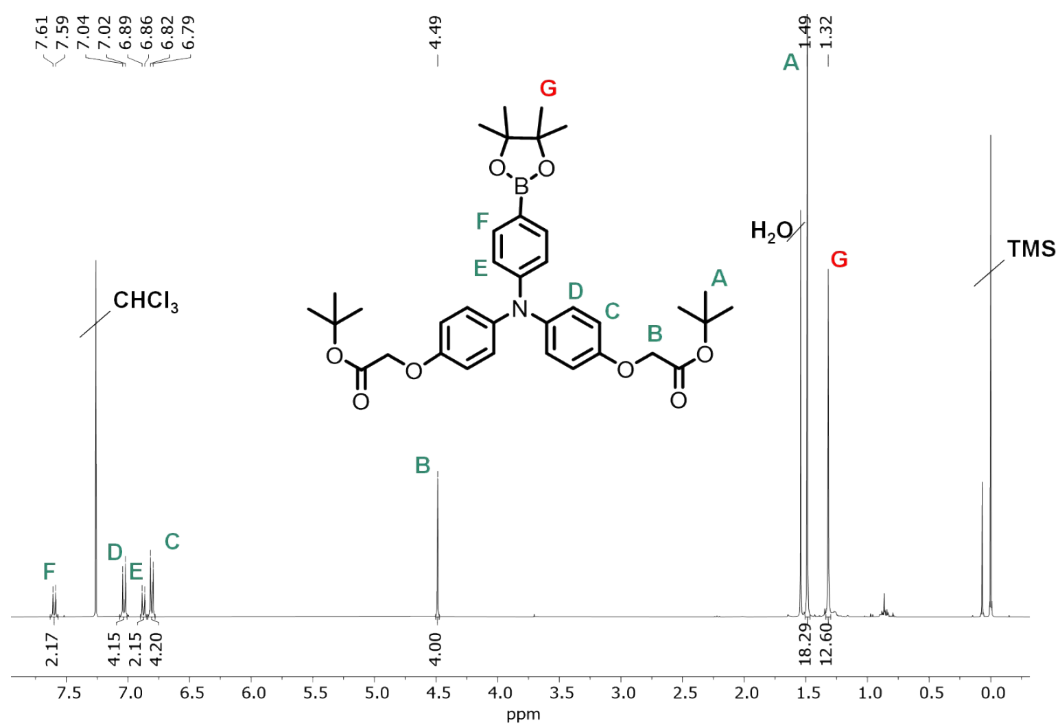


Figure S 2¹H-NMR of **6** in CDCl₃

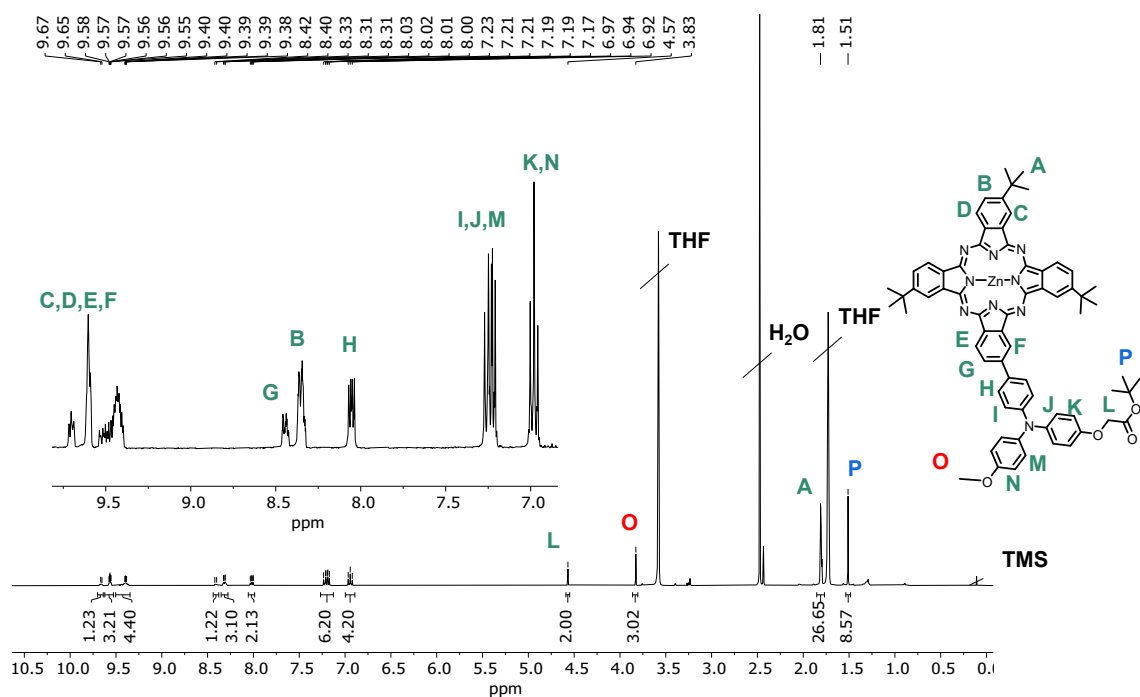


Figure S 3 ^1H -NMR of **ZnPc-3** in $\text{THF-}d_8$

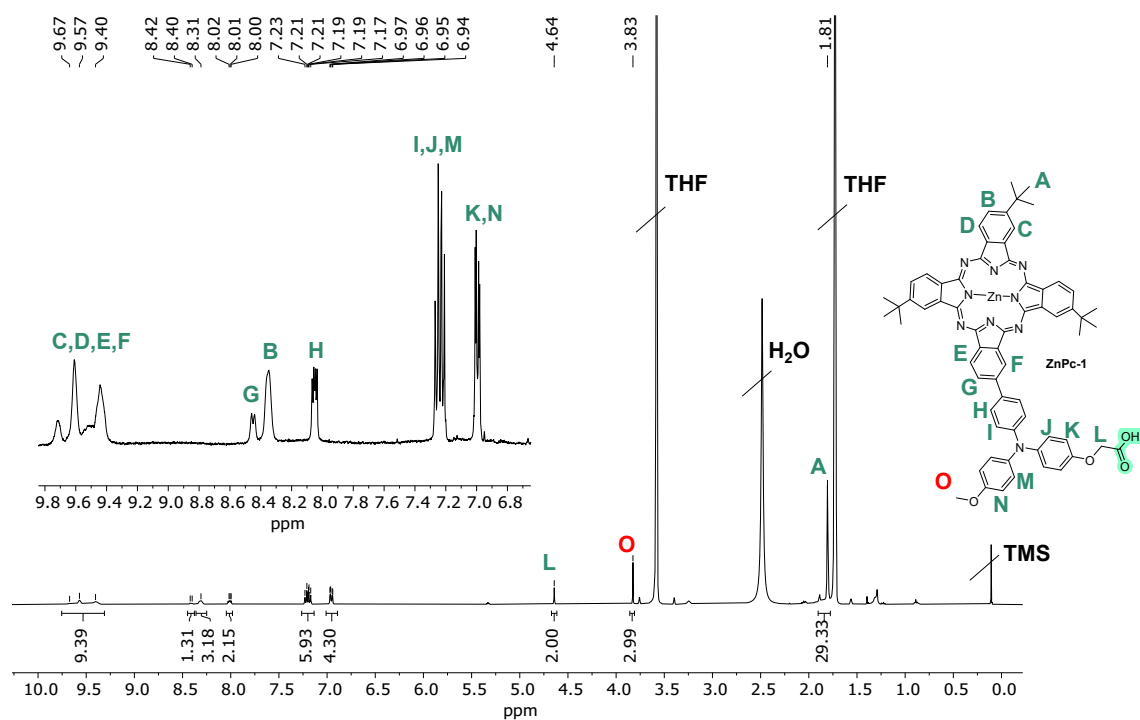


Figure S 4 ^1H -NMR of **ZnPc-1** in $\text{THF-}d_8$

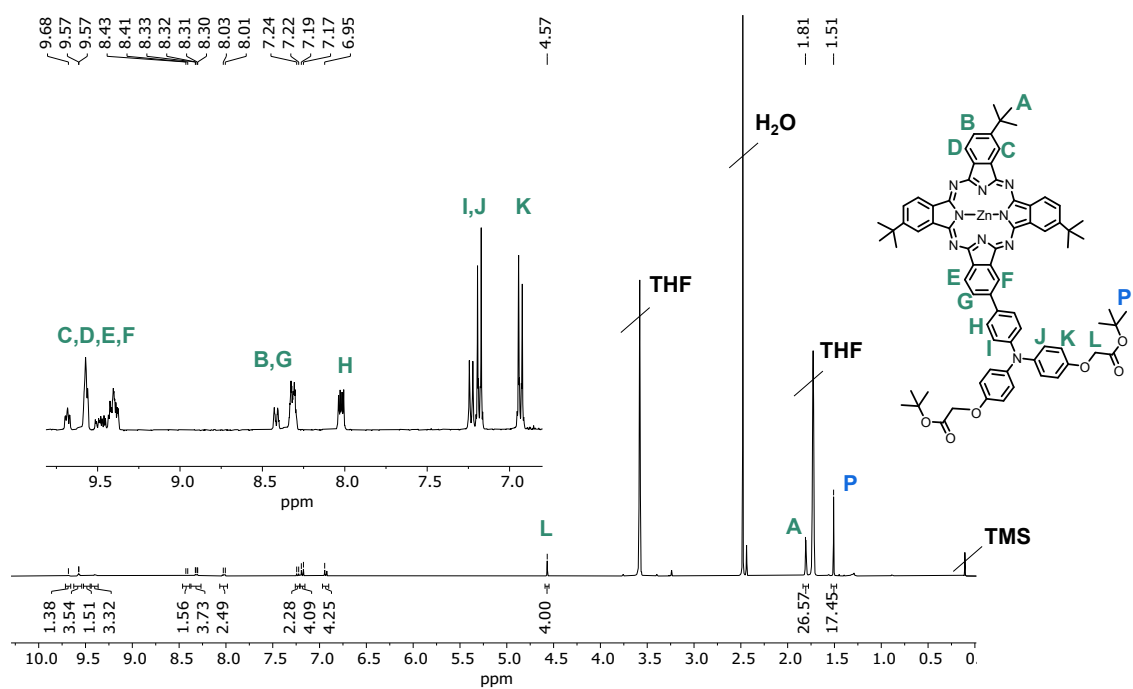


Figure S 5 ¹H-NMR of **ZnPc-4** in THF-*d*₈

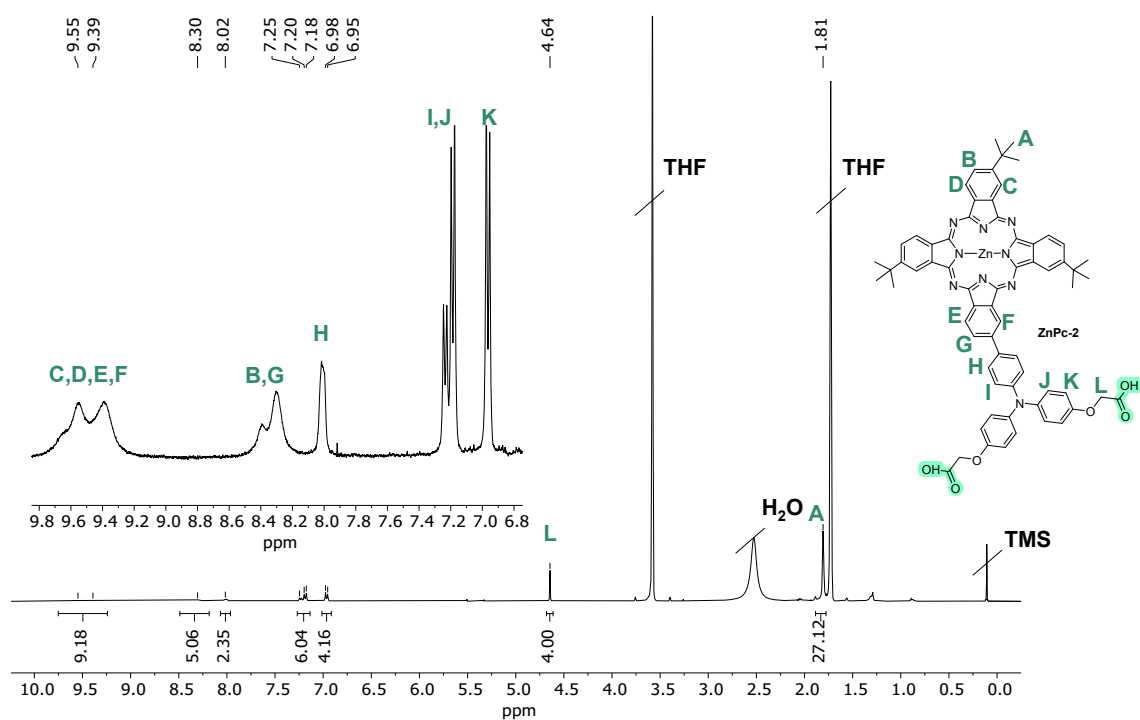


Figure S 6 ¹H-NMR of **ZnPc-2** in THF-*d*₈

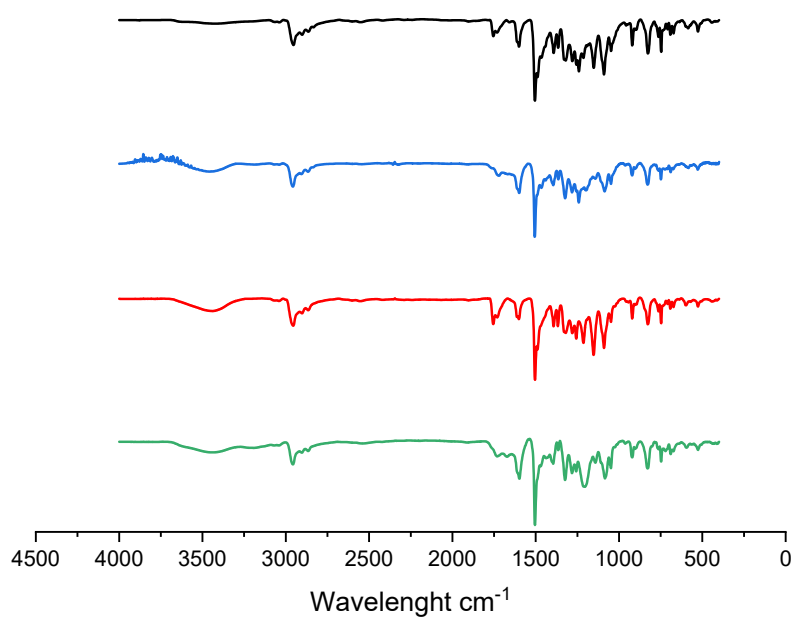


Figure S 7. IR spectra of **ZnPc-1** (blue), **-2** (green), **-3** (black), and **-4** (red)

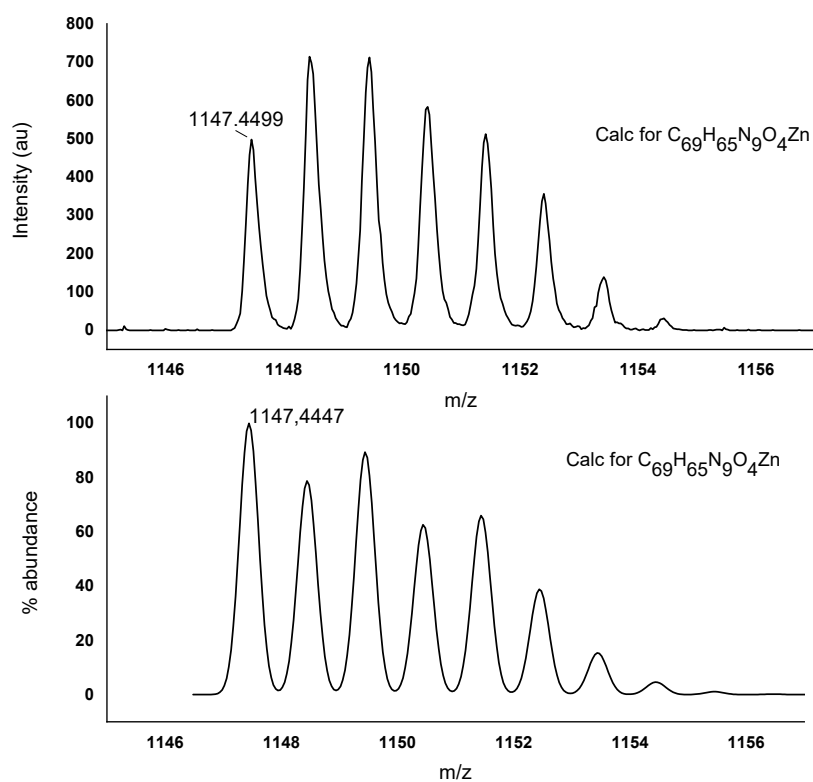


Figure S 8. HR-MALDI-TOF spectrum of **ZnPc-3**.

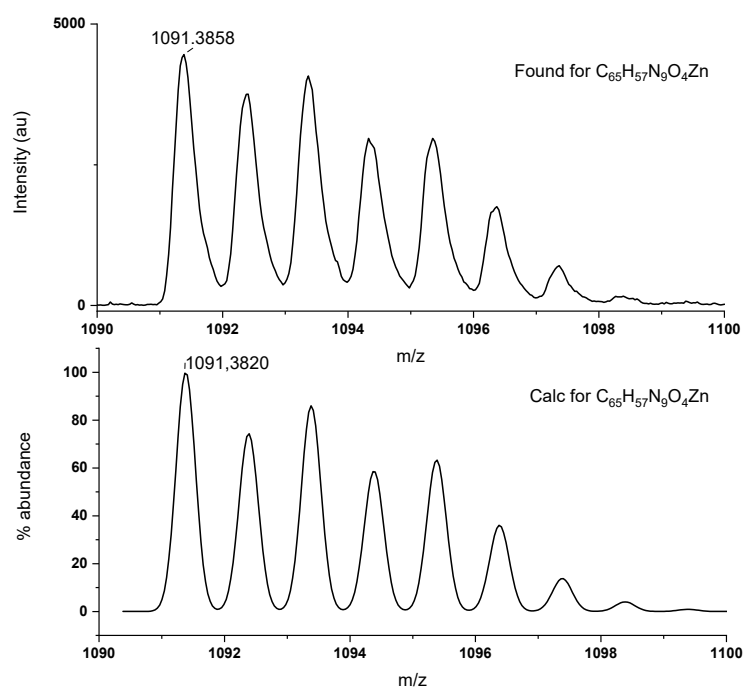


Figure S 9. HR-MALDI-TOF spectrum of **ZnPc-1**.

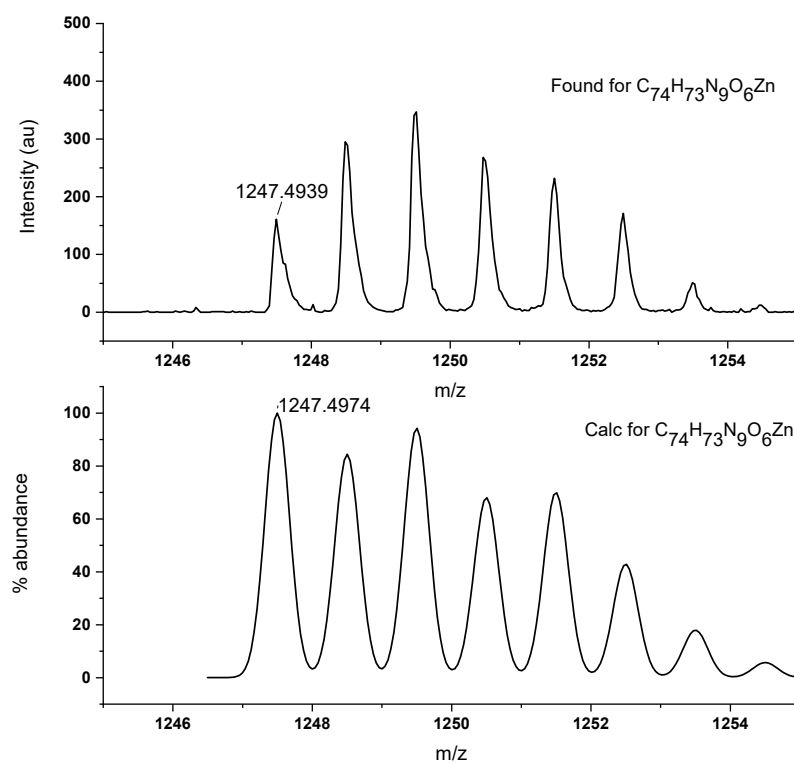


Figure S 10. HR-MALDI-TOF spectrum of **ZnPc-4**.

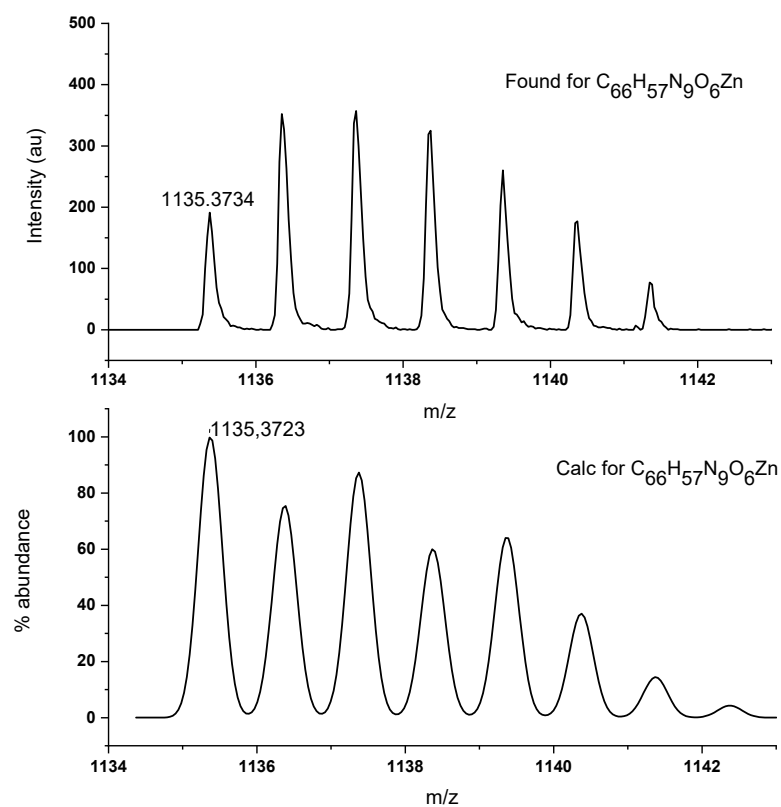


Figure S 11. HR-MALDI-TOF spectrum of **ZnPc-2**.

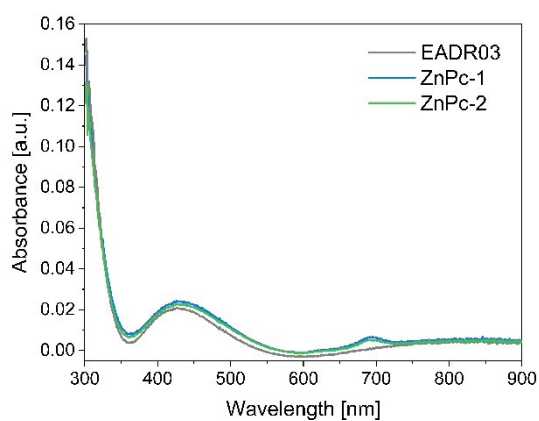


Figure S12. UV-Vis absorption spectra of glass/ITO/SAMs acquired at 300-900 nm

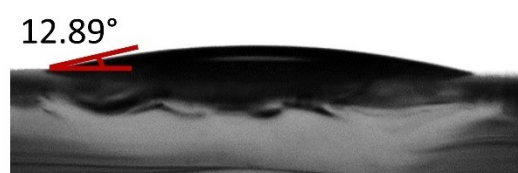


Figure S13. Water contact angle measurement on bare ITO.

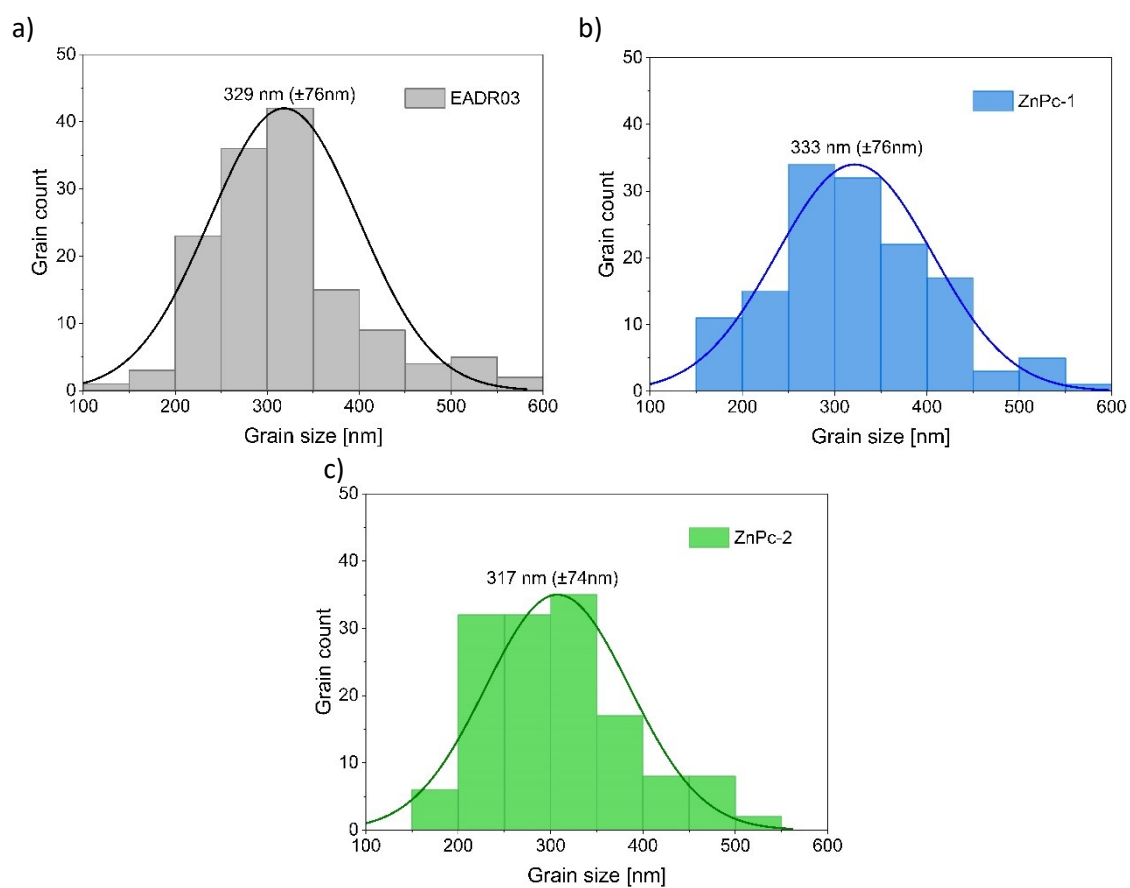


Figure S14. Grain size distribution of perovskite films deposited on top of a) EADR03, b) ZnPc-1 and c) ZnPc-2.

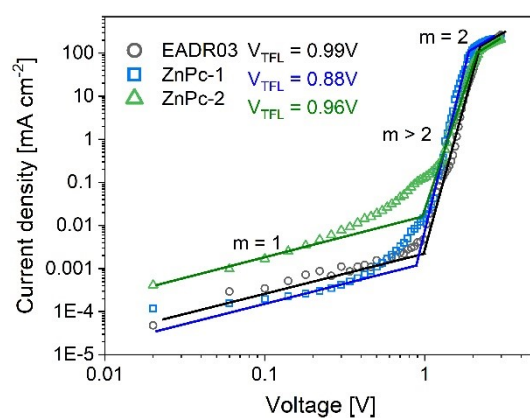


Figure S15. Dark current-voltage curves (log-log scale) of hole-only devices based on ZnPc SAMs and EADR03.

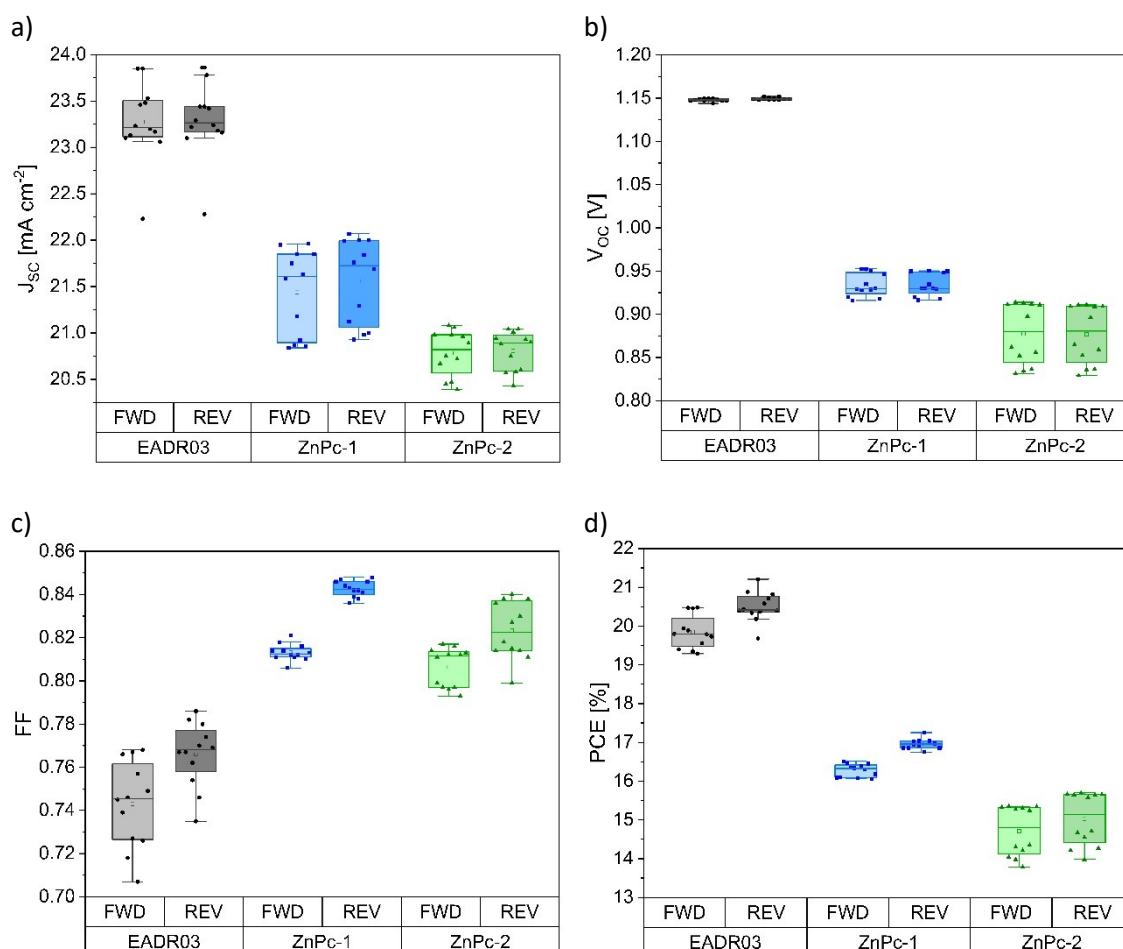


Figure S16. Box plot charts of statistical distribution of photovoltaic parameters: a) short-circuit current density, b) open-circuit voltage, c) fill factor (FF), and d) power conversion efficiency.