

## Supporting Information

### **Designed Multi-Layer Buffer for High-Performance Semitransparent Wide-Bandgap Perovskite Solar Cells**

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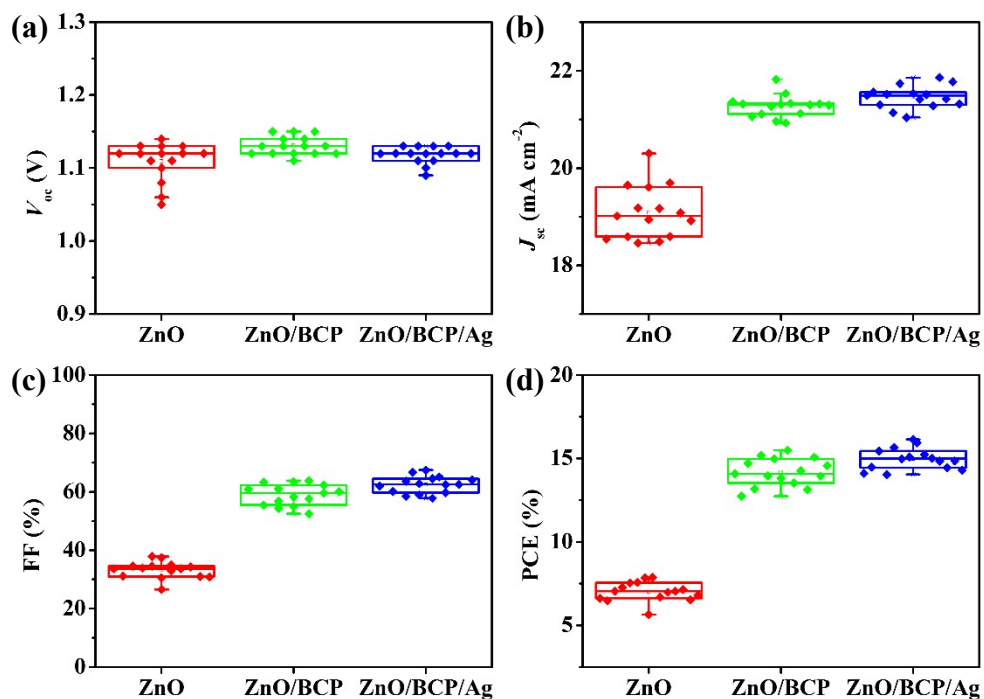


Figure S1. Statistical photovoltaic parameters of ST-PSCs based on different buffers: ZnO, ZnO/BCP or ZnO/BCP/Ag. The data were collected from 15 cells for each kind of ST-PSCs.

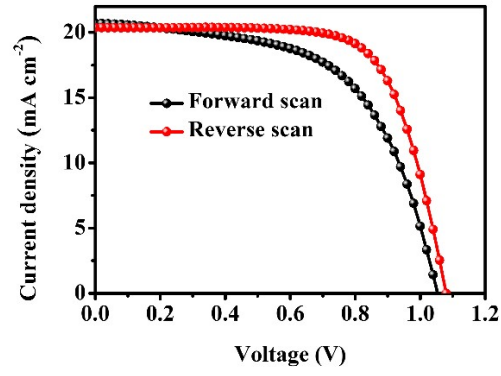


Figure S2. Forward ( $V_{oc}=1.05$  V,  $J_{sc}=20.71$  mA cm<sup>-2</sup>, FF= 58.10%, PCE=12.68%) and reverse ( $V_{oc}=1.08$  V,  $J_{sc}=20.36$  mA cm<sup>-2</sup>, FF= 70.21%, PCE=15.44%) direction scanned  $J$ - $V$  curves for ST-PSCs with effective area of 1 cm<sup>2</sup>.

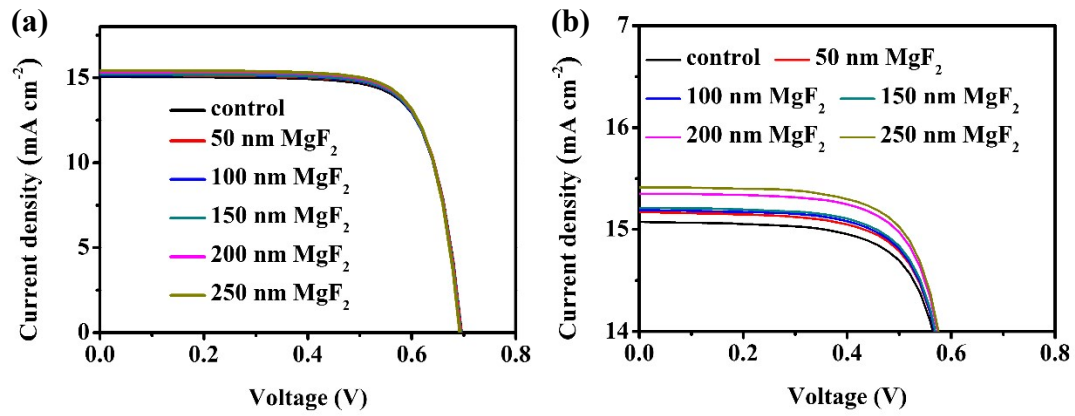


Figure S3. (a, b)  $J$ - $V$  curves and their partial enlarged drawing of filtered silicon cell with different thickness of  $\text{MgF}_2$  on TCO side of filter.

Table 1. Summary of lifetime parameters extracted from fitting curves of TRPL file.

	$A_1$	$\tau_1$ (ns)	$A_2$	$\tau_2$ (ns)	$\tau_{ave}$ (ns)	$y_0$
ZnO	0.940	1.40	0.060	36.0	22.90	0.010
ZnO/BCP	0.955	1.35	0.045	36.0	20.65	0.008
ZnO/BCP/Ag	0.965	1.35	0.035	36.0	18.39	0.008