Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

TiO_2 quantum dots as superb compact block layer for high-performance $CH_3NH_3PbI_3$ perovskite solar cells with efficiency of 16.97%

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Table S1. Fitting parameters for EIS data under 1 sun illumination.

Device	Rs(Ω)	Rco(Ω)	Cco(F)	Rrec(Ω)	CPEμ-T(F)	CPEμ-p(F)
QD-CL	26.66	63.76	1.9967E-7	1.000E+20	0.0084568	0.27033
TAA-CL	34.89	155.7	6.0264E-8	1.585E+18	0.0042675	0.29826
$TiCl_4$-CL	51.08	279.9	4.0823E-8	2.647E+15	0.0023233	0.59371

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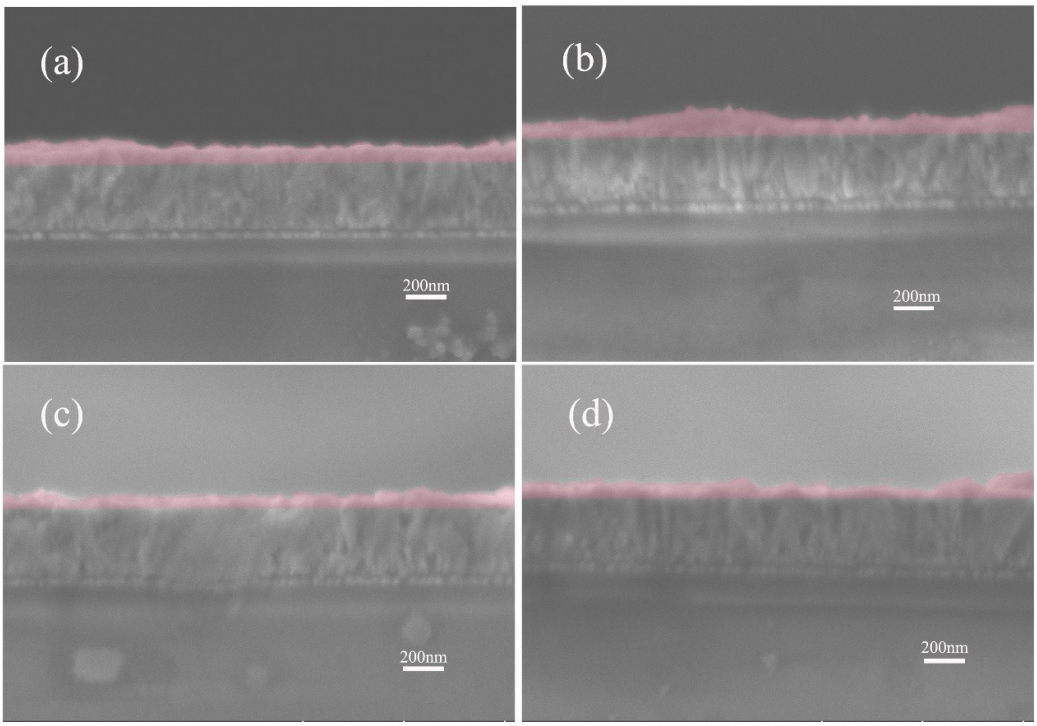

Fig. S1 Cross-sectional SEM images of $TiCl_4$-CL with different speed (a) 1000 rpm, (b) 2000 rpm, (c) 4000 rpm, (d) 6000 rpm.

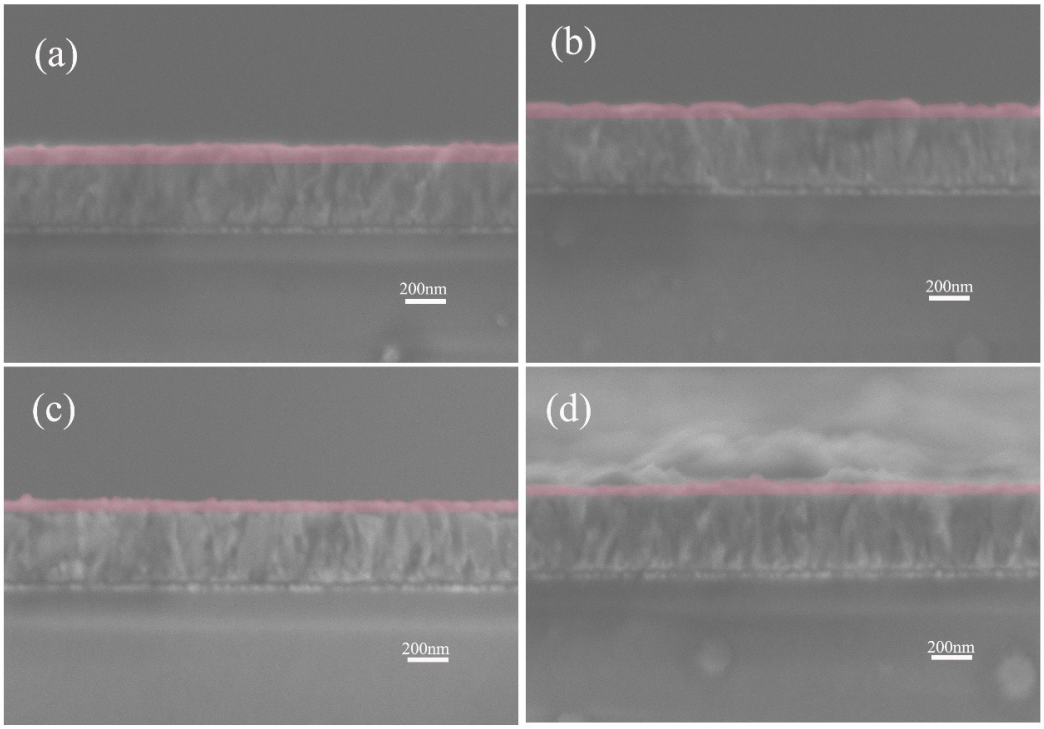

Fig. S2 Cross-sectional SEM images of TAA-CL with different speed (a) 1000 rpm, (b) 2000 rpm, (c) 4000 rpm, (d) 6000rpm.

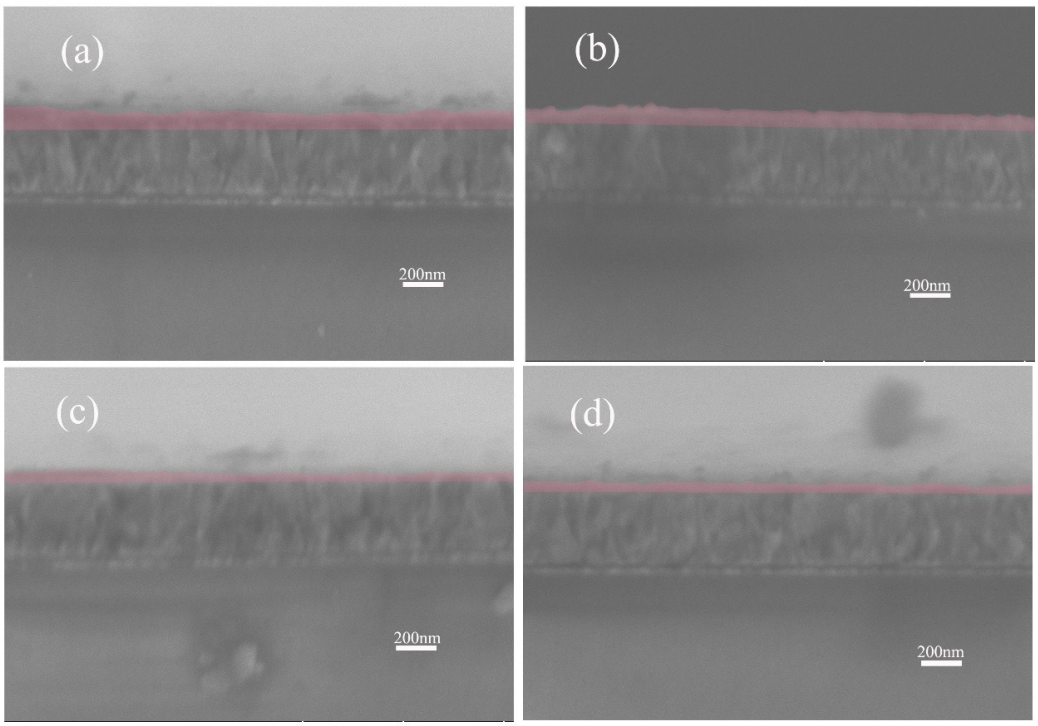

Fig. S3 Cross-sectional SEM images of QD-CL with different speed (a) 1000 rpm, (b) 2000 rpm, (c) 4000 rpm, (d) 6000 rpm.

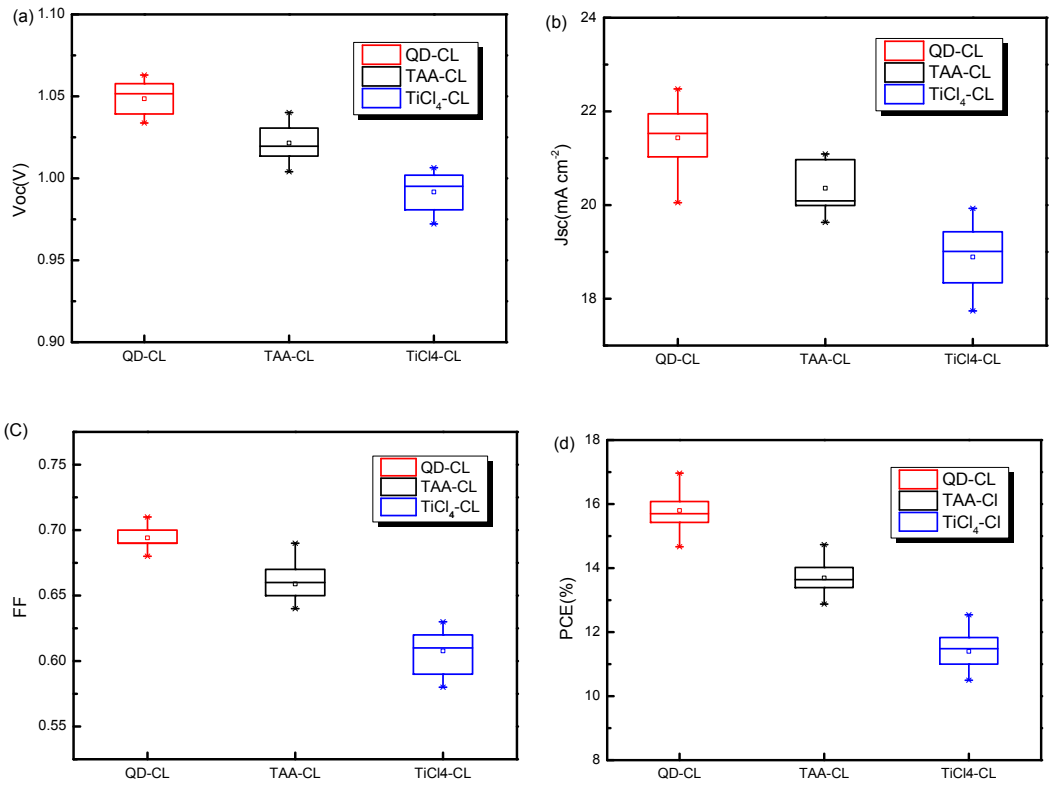

Fig. S4 Photovoltaic parameters of (a) V_{OC}, (b) J_{SC}, (c) FF and (d) PCE extracted from I-V measurements of the solar cells based on QD-CL, TAA-CL, $TiCl_4$-CL (Each parameters is calculated from a batch of 27 cells).