Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Band alignment of TiO_2 through controling Cl content for high-efficiency perovskite solar cells

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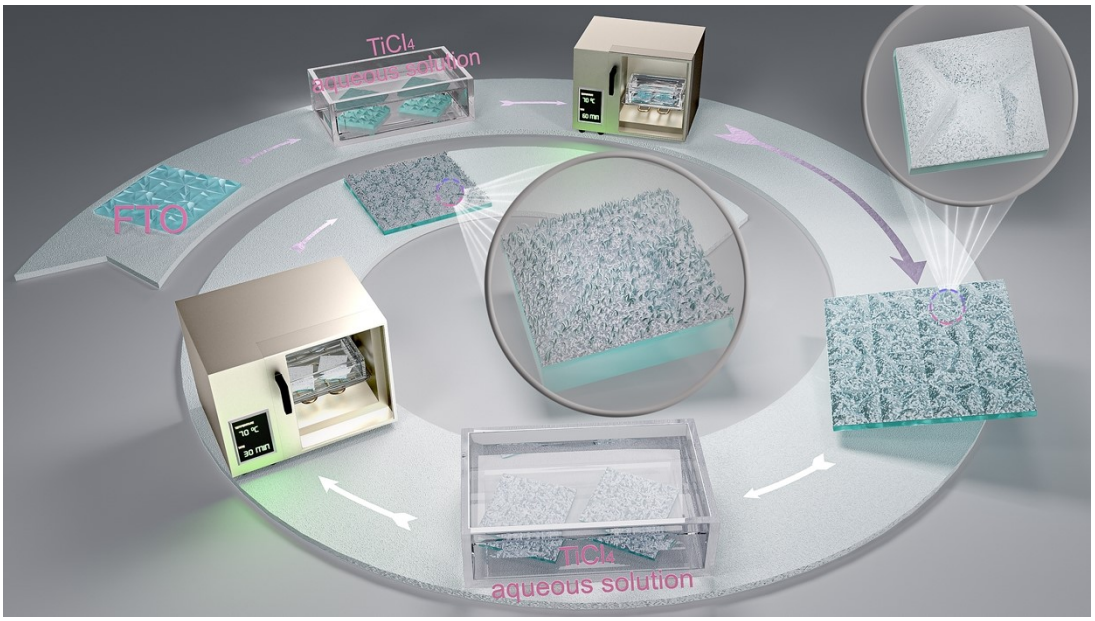

Figure S1 Diagram of TiO_2 preparation process

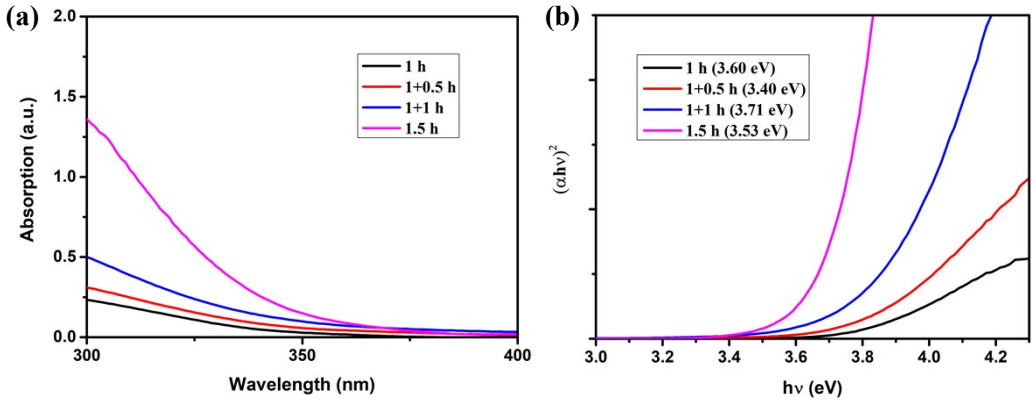

Figure S2 TiO_2 absorption and energy band changes at different growth times. (a) TiO_2 absorption plots at different growth times. (b) TiO_2 Tauc-plot plots with different growth times.

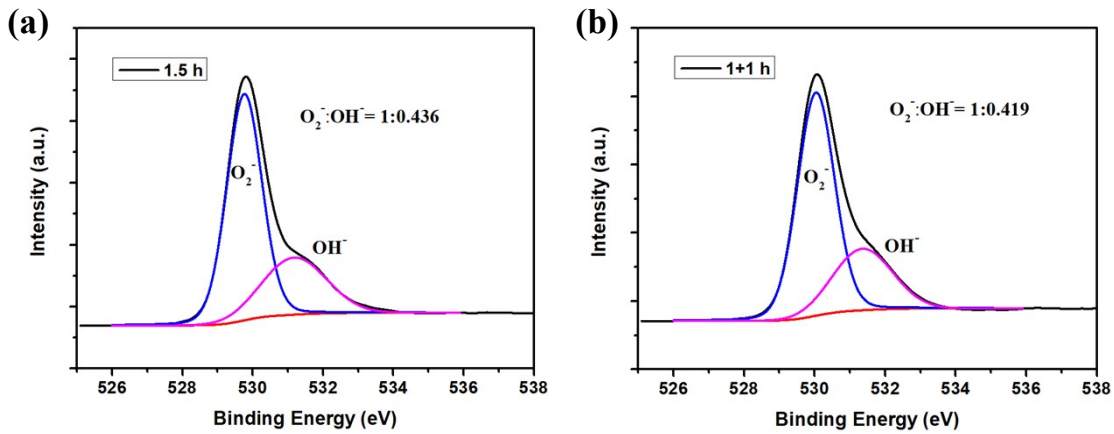

Figure S3 XPS test diagram of TiO_2 surface with different growth time. (a) 1.5 h. (b)1+1 h.

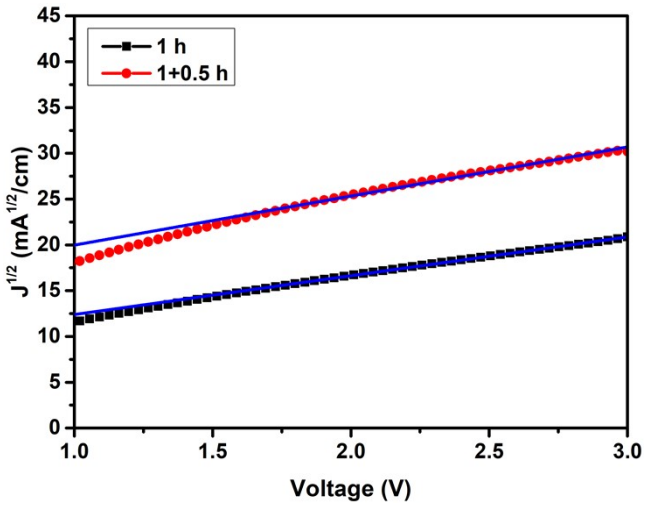

Figure S4 The electron mobility of TiO_2 was evaluated using the SCLC model.

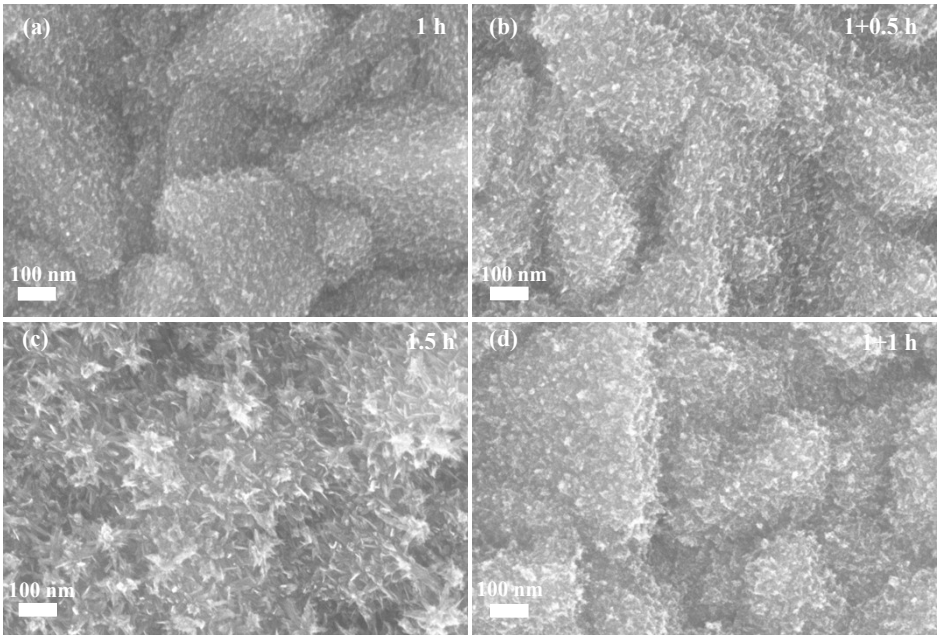

Figure S5 SEM images of TiO_2 surface at different growth times. (a)1 h. (b)1+0.5 h. (c)1.5 h. (d)1+1 h.

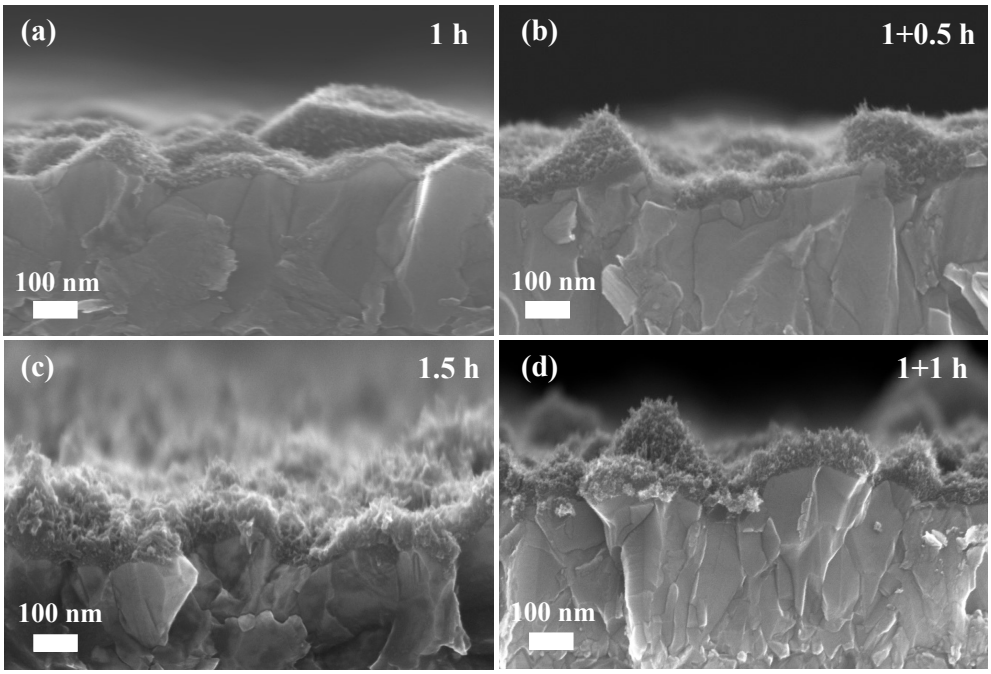

Figure S6 SEM images of TiO_2 growing at different times. (a)1 h. (b)1+0.5 h. (c)1.5 h. (d)1+1 h.

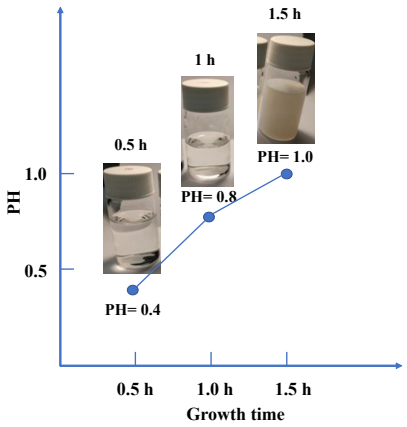

Figure S7 PH value of TiO_2 solution grown at different times

Table S1 Average carrier lifetime of perovskite films prepared on 1 h and 1+0.5 h TiO_2 films

Growth time	τ_1/ns(A_1)	τ_2/ns(A_2)	τ_{ave}/ns
1 h	92.44（0.092）	890.62（0.876）	882.01
1+0.5 h	83.63（0.151）	629.33（0.799）	615.96