

Supporting Information

Garden-Like Perovskite Superstructure with Enhanced Photocatalytic Activity

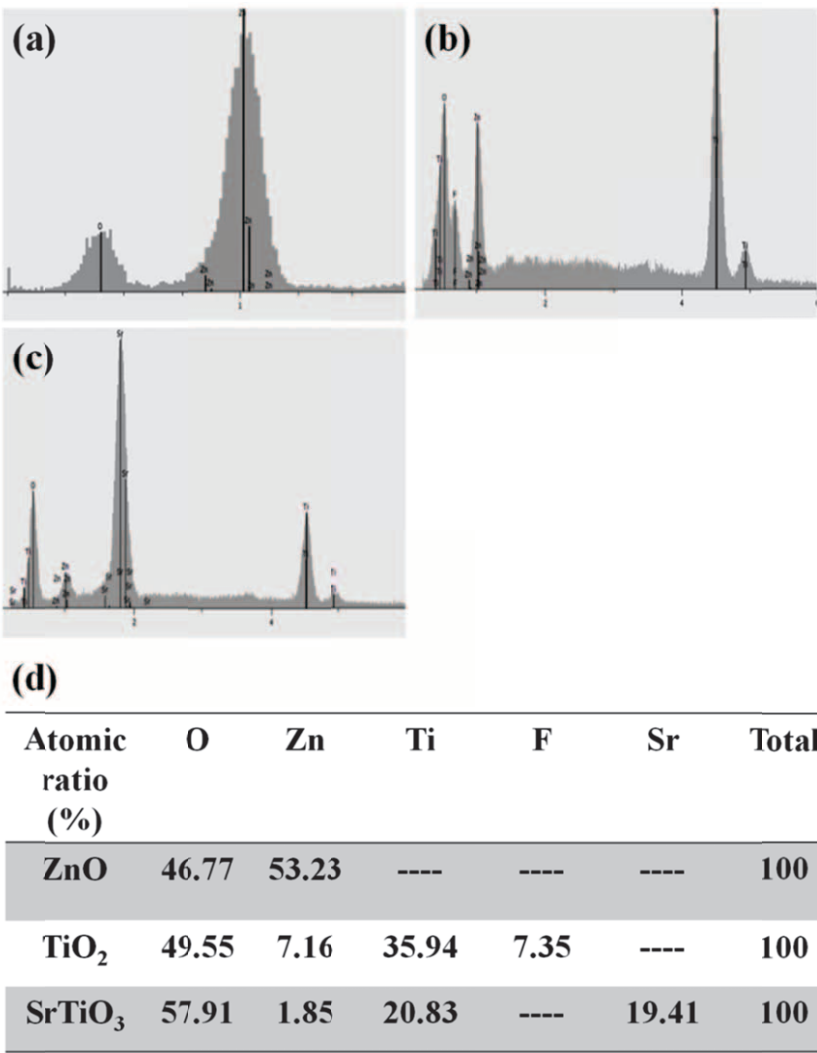
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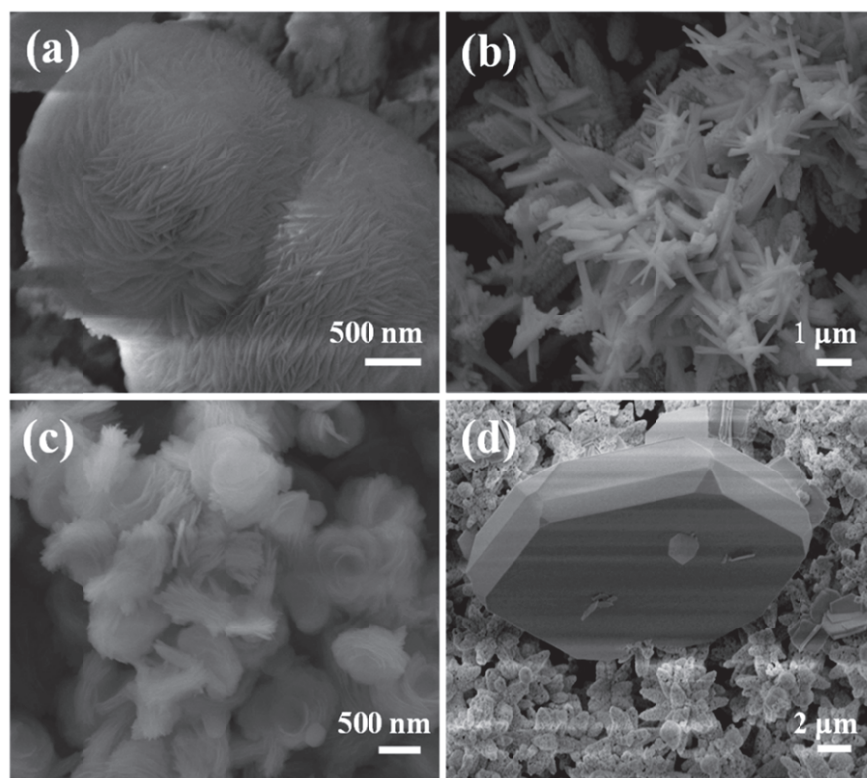
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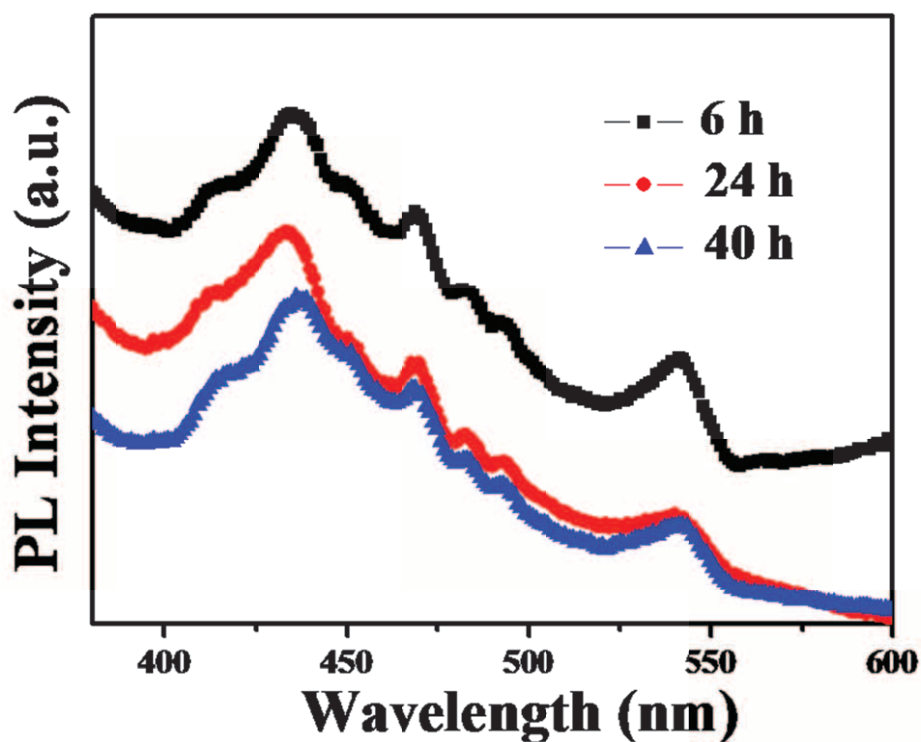


**Figure S1.** EDS spectra of (a) ZnO flowers, (b) TiO<sub>2</sub> flowers, and (c) SrTiO<sub>3</sub> garden, respectively. (d) Table summarizes the element contents in ZnO flowers, TiO<sub>2</sub> flowers and SrTiO<sub>3</sub> garden, respectively.

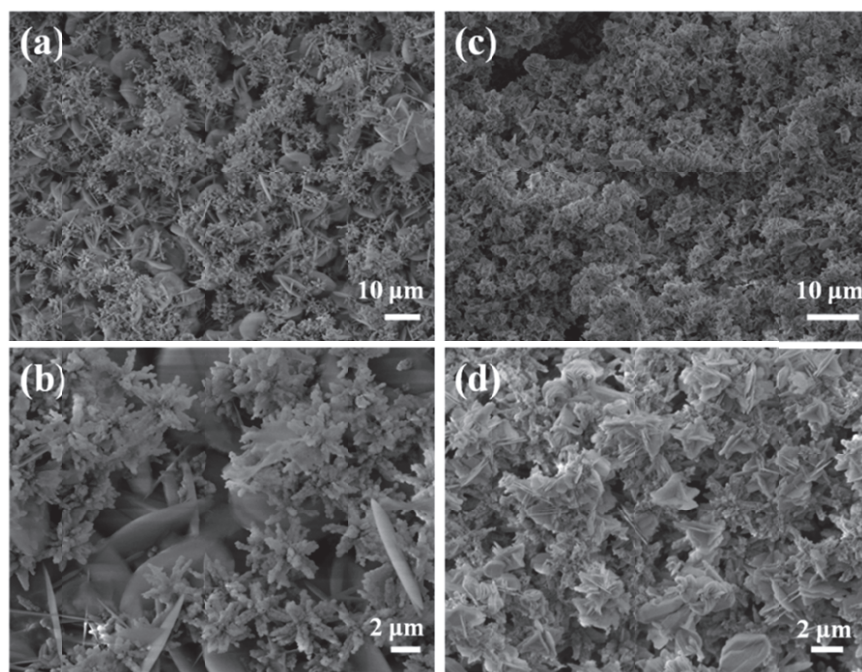
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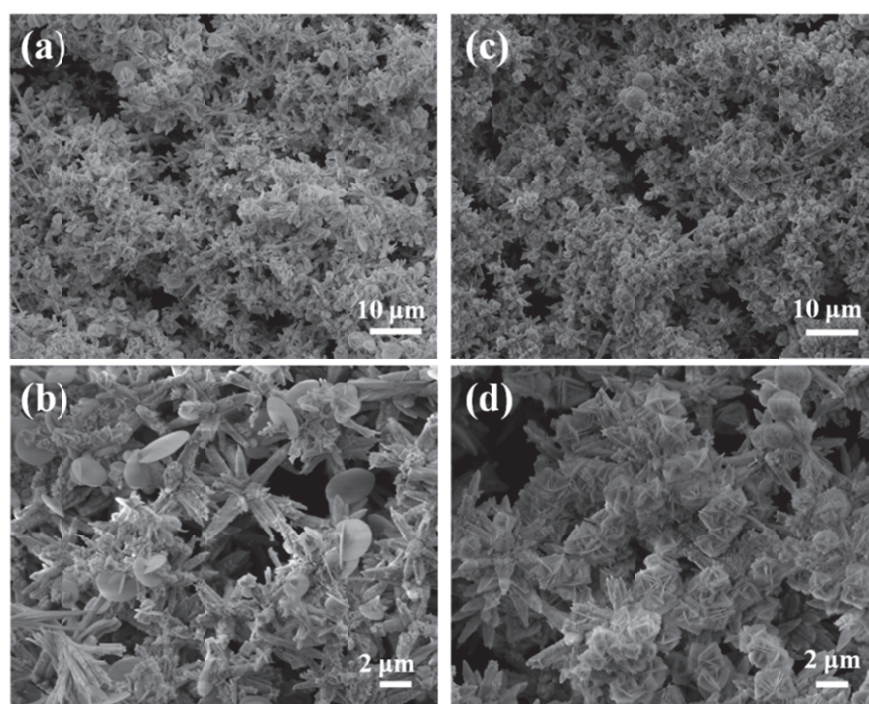
**Figure S2.** SEM images of (a)  $\text{SrTiO}_3$ , (b)  $\text{BaTiO}_3$ , (c)  $\text{CaTiO}_3$ , and (d)  $\text{Pb}_2\text{Ti}_2\text{O}_6$ .



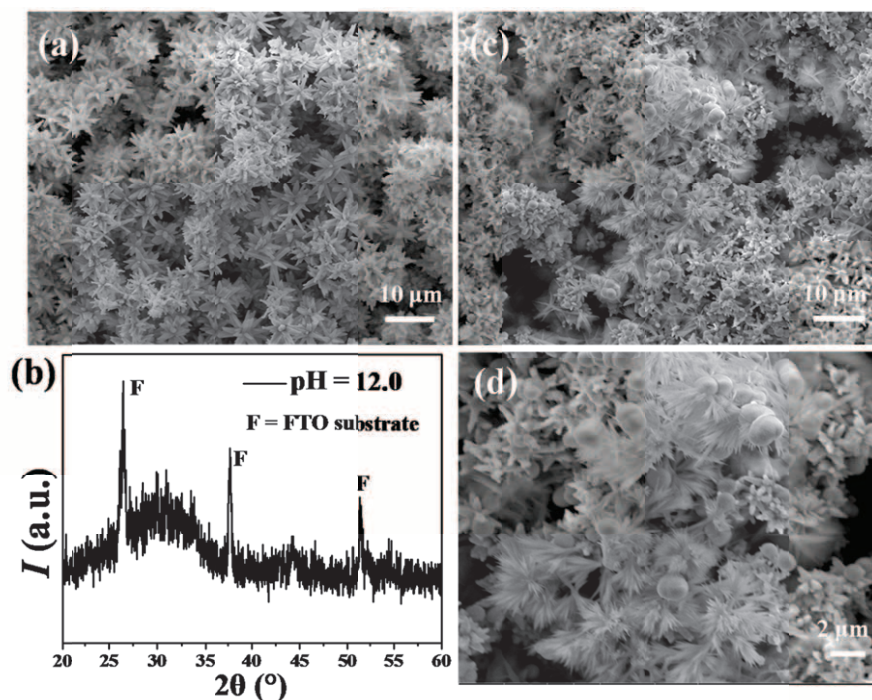
**Figure S3.** Room temperature PL spectra of  $\text{SrTiO}_3$  prepared at different hydrothermal times.



**Figure S4.** SEM images of SrTiO<sub>3</sub> gardens prepared by hydrothermally treating TiO<sub>2</sub> flowers in aqueous solution containing 0.1 M (CH<sub>3</sub>COO)<sub>2</sub>Sr at pH = 13.00 at different temperatures for 24 h. (a) and (b) 150 °C, and (c) and (d) 200 °C.

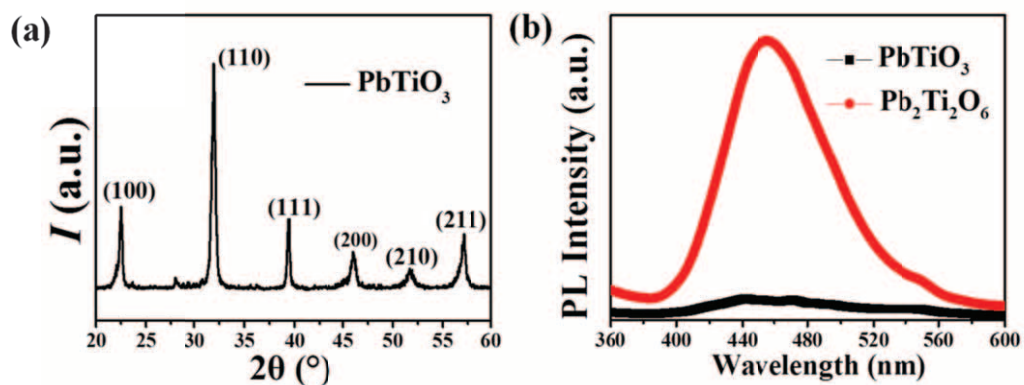


**Figure S5.** SEM images of SrTiO<sub>3</sub> gardens prepared by hydrothermally treating TiO<sub>2</sub> flowers in the (CH<sub>3</sub>COO)<sub>2</sub>Sr solution at different concentrations: (a) and (b) 0.05 M, and (c) and (d) 0.2 M at pH = 13.00 at 180 °C for 24 h.



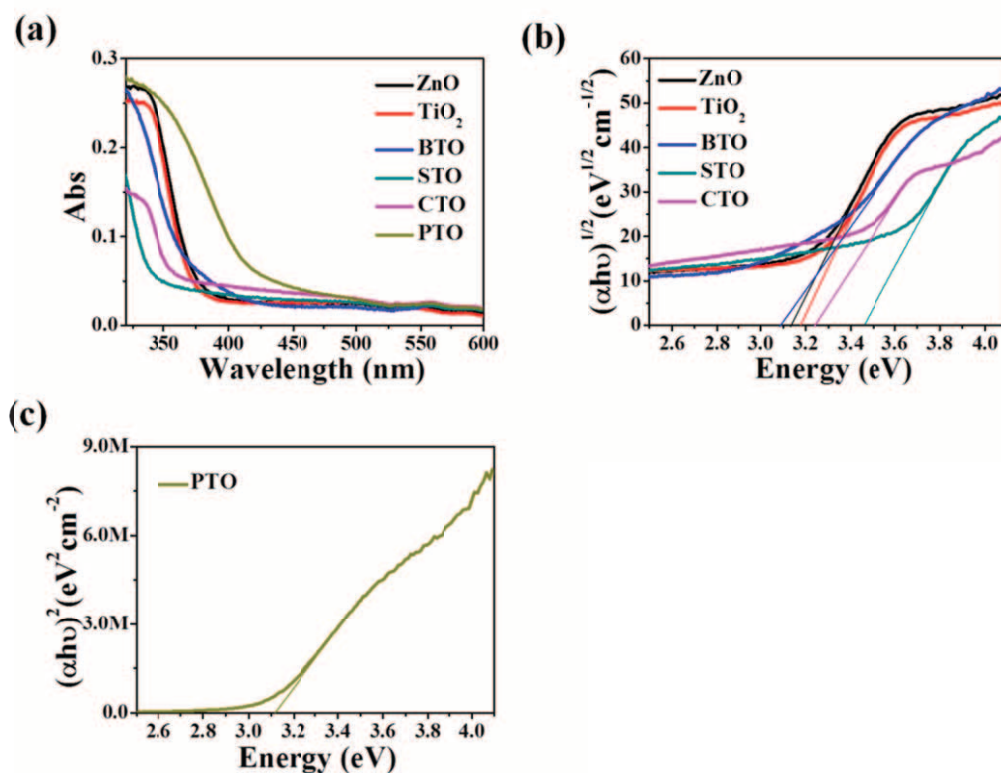
**Figure S6.** SEM images of  $\text{SrTiO}_3$  gardens prepared in the  $(\text{CH}_3\text{COO})_2\text{Sr}$  solution at pH of (a) 12.00, (c) and (d) 13.50, respectively. (b) XRD pattern of the sample in (a).

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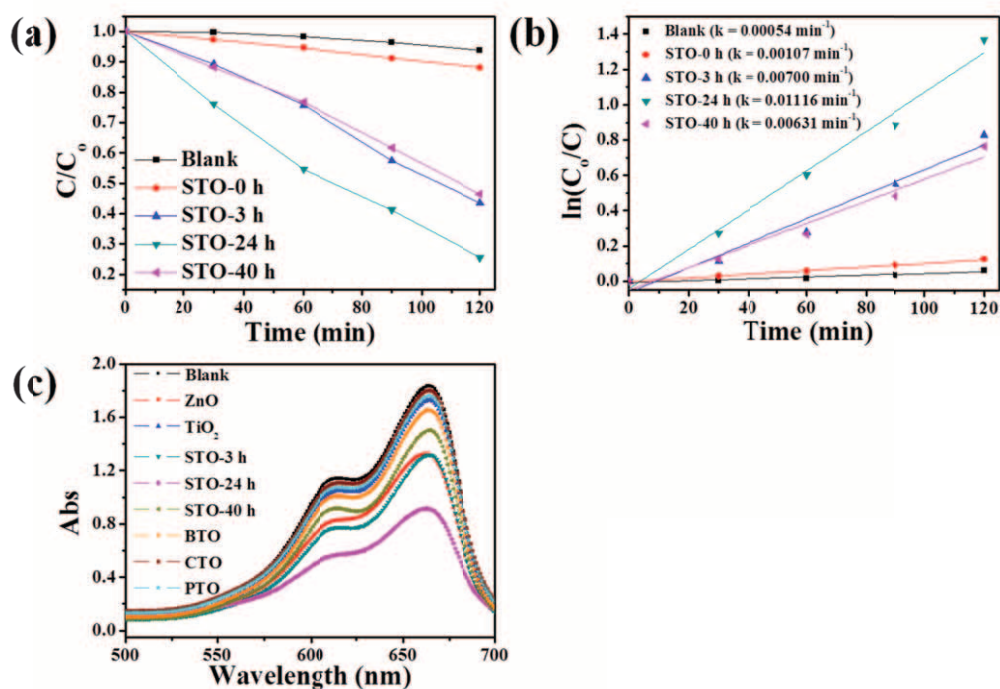


**Figure S7.** (a) XRD pattern of  $\text{PbTiO}_3$  obtained by annealing  $\text{Pb}_2\text{Ti}_2\text{O}_6$  at 600  $^\circ\text{C}$  for 2 h. (b) Room temperature PL spectra of  $\text{Pb}_2\text{Ti}_2\text{O}_6$  and  $\text{PbTiO}_3$ , respectively.

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**Figure S8.** (a) UV-vis absorption spectra of different samples. (b and c) Band gap,  $E_g$ , of the samples estimated from the absorption edge. STO, BTO, CTO, and PTO represent SrTiO<sub>3</sub>, BaTiO<sub>3</sub>, CaTiO<sub>3</sub>, and PbTiO<sub>3</sub>, respectively. For STO, BTO and CTO,  $n = 2$  in  $(\alpha h\nu)^{1/n} = \beta (h\nu - E_g)$ ; while for PTO,  $n = 1/2$  in  $(\alpha h\nu)^{1/n} = \beta (h\nu - E_g)$ .



**Figure S9.** Photocatalytic degradation rates of MB by SrTiO<sub>3</sub> prepared at different times under UV light irradiation. (a)  $C/C_0$  vs.  $t$ , and (b)  $\ln(C/C_0)$  vs.  $t$ . (c) Changes of UV-Vis spectra of MB for different samples after 1 h adsorption in the dark using different catalysts. STO, BTO, CTO, and PTO represent SrTiO<sub>3</sub>, BaTiO<sub>3</sub>, CaTiO<sub>3</sub>, and PbTiO<sub>3</sub>, respectively.