Supporting Information

Constructing bulk defective perovskite $SrTiO_3$ nanocubes for high performance photocatalyst

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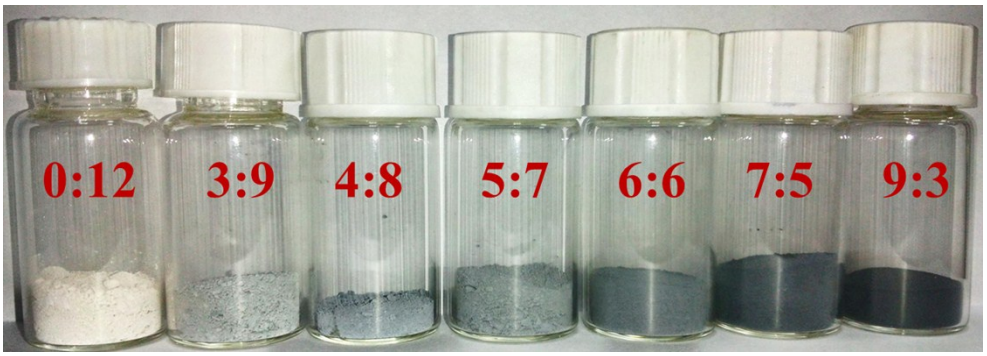

Figure S1. The optical images of $SrTiO_3$ (0:12, 3:9, 4:8, 5:7, 6:6, 7:5 and 9:3).

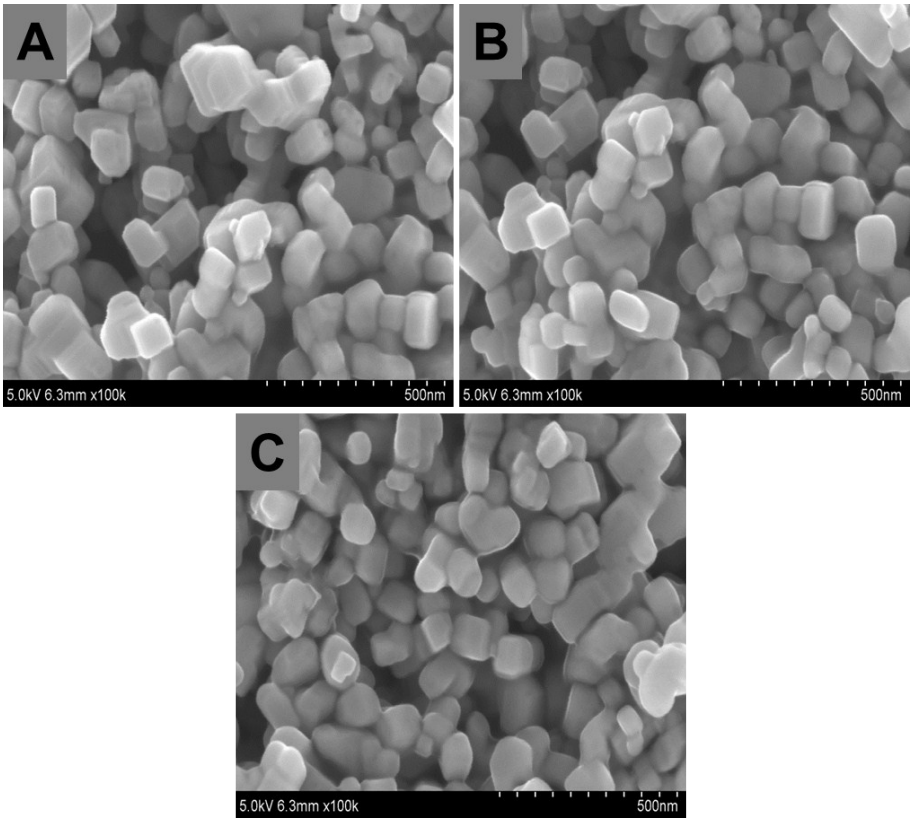

Figure S2. Field emission scanning electron microscopy (FE-SEM) images of $SrTiO_3$ 0:12 (A), 3:9 (B) and 9:3 (C).

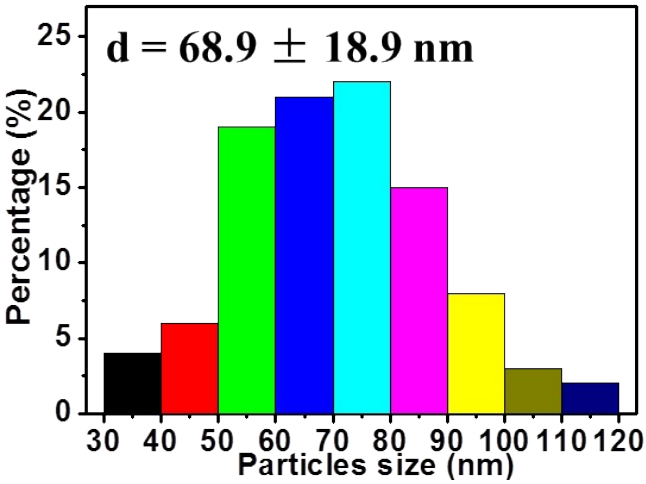

Figure S3. The particles size distribution of $SrTiO_3$ 5:7.

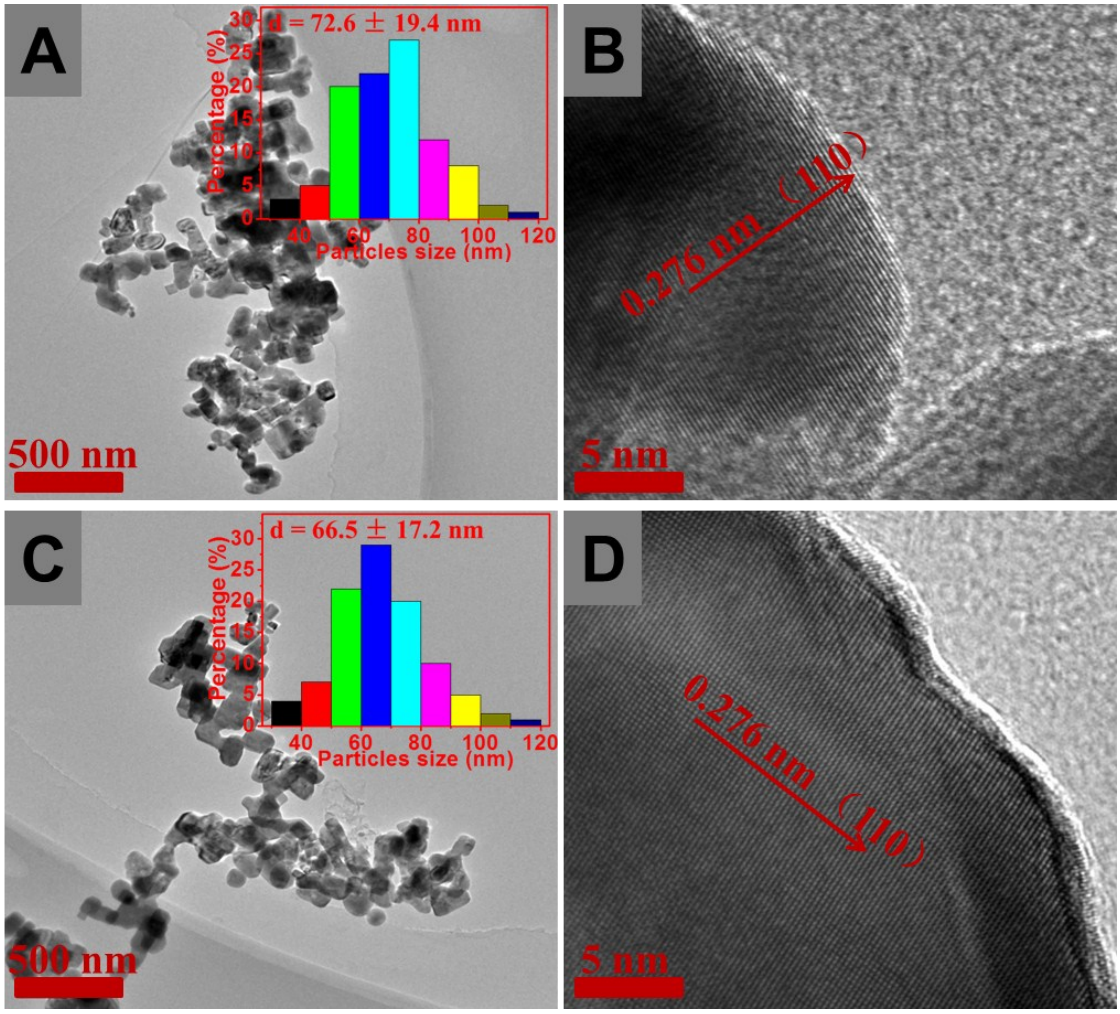

Figure S4. Low resolution TEM images (A, C) and high resolution TEM images (B, D). $SrTiO_3$ 0:12 (A, B) and 9:3 (C, D). Insets of A and C are the particles size distribution of $SrTiO_3$ 0:12 and 9:3.

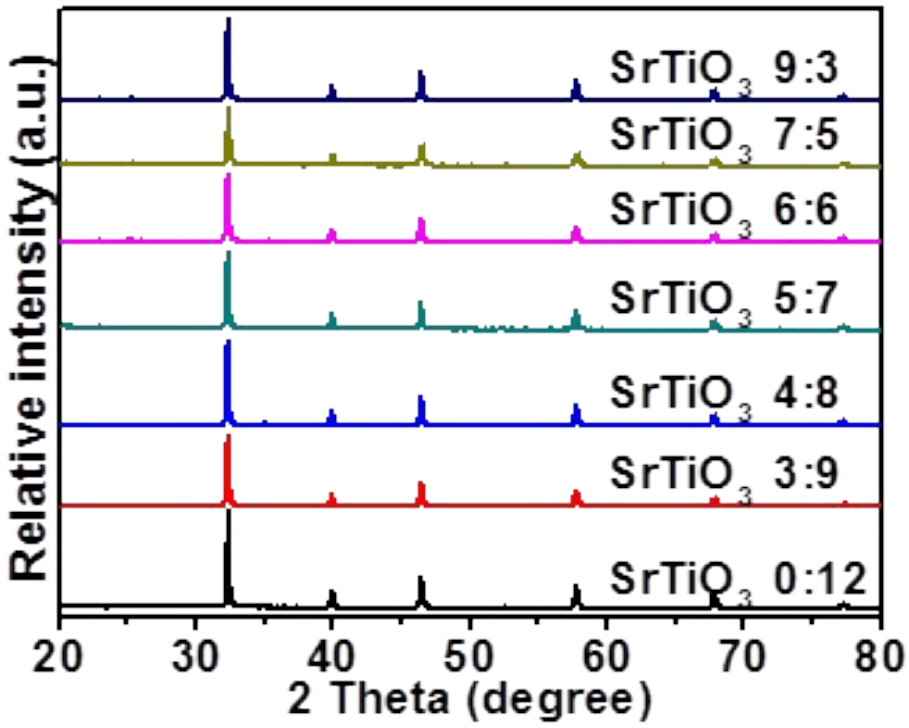

Figure S5. XRD patterns of $SrTiO_3$ (0:12, 3:9, 4:8, 5:7, 6:6, 7:5 and 9:3).

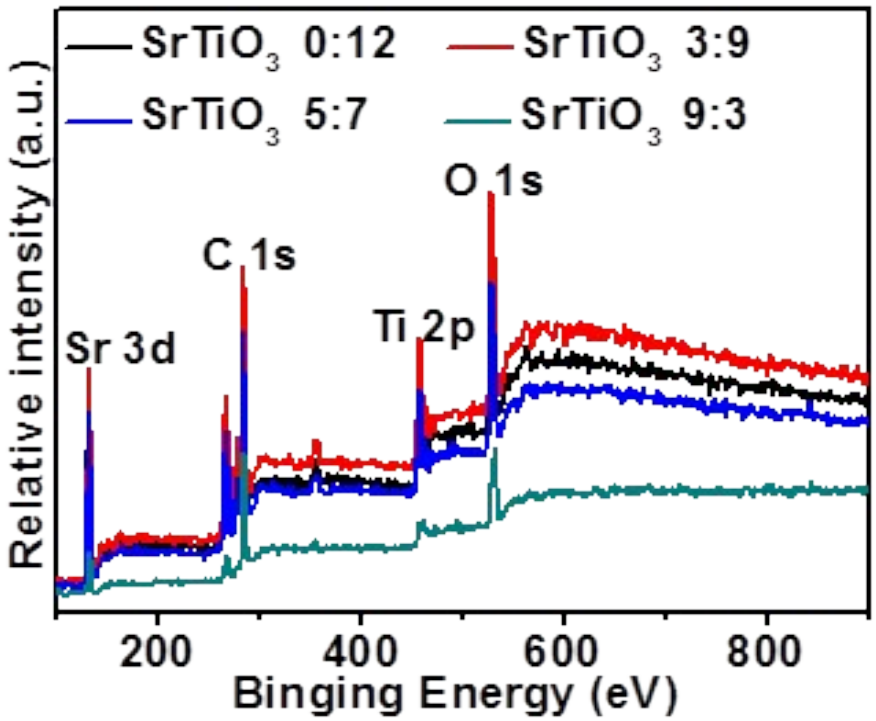

Figure S6. The full XPS spectrum of $SrTiO_3$ (0:12, 3:9, 5:7 and 9:3).

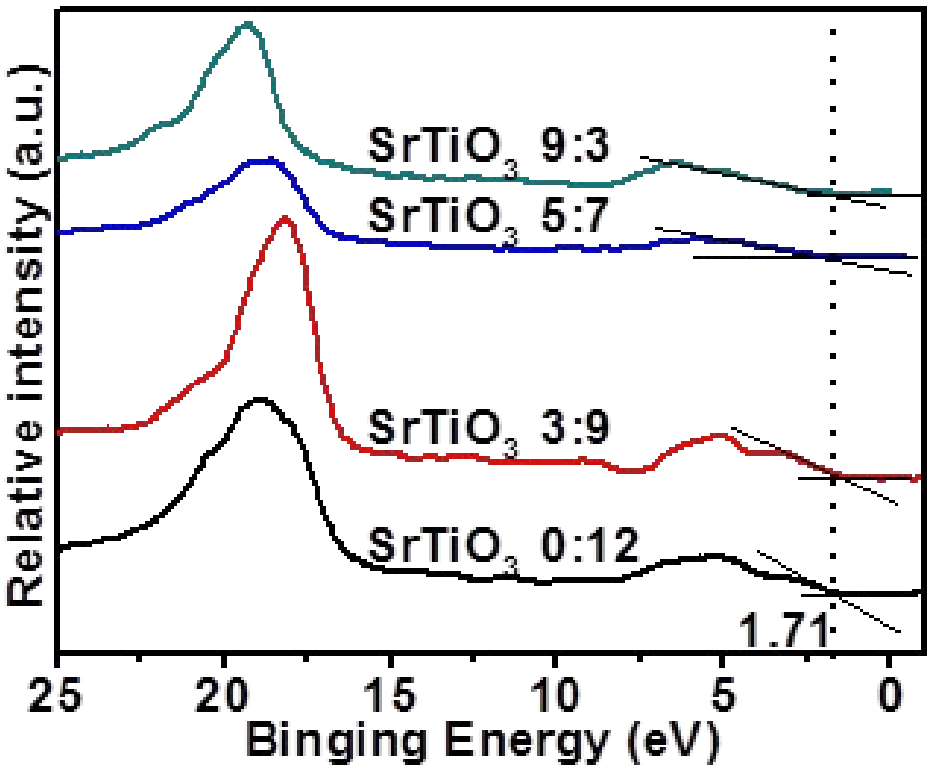

Figure S7. The valence band XPS spectrum of $SrTiO_3$ (0:12, 3:9, 5:7 and 9:3).

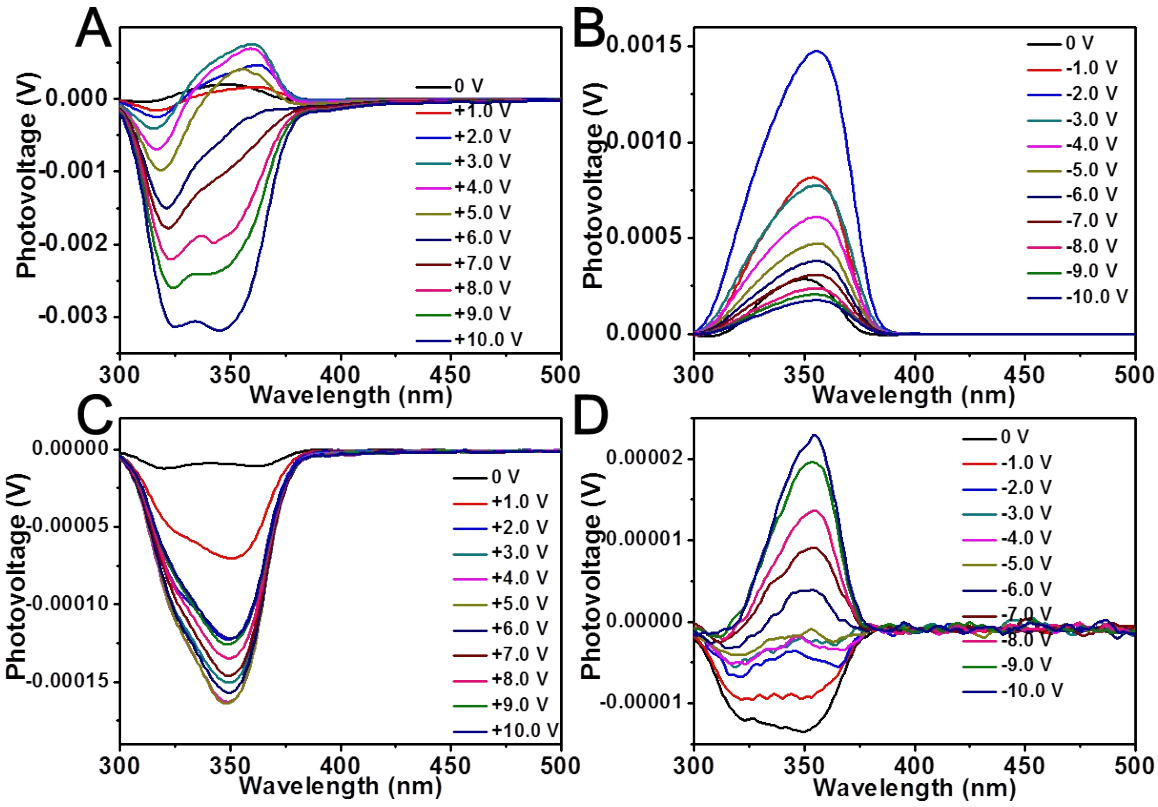

Figure S8. Surface photovoltage response of $SrTiO_3$ 0:12 (A, B) and 5:7 (C, D).

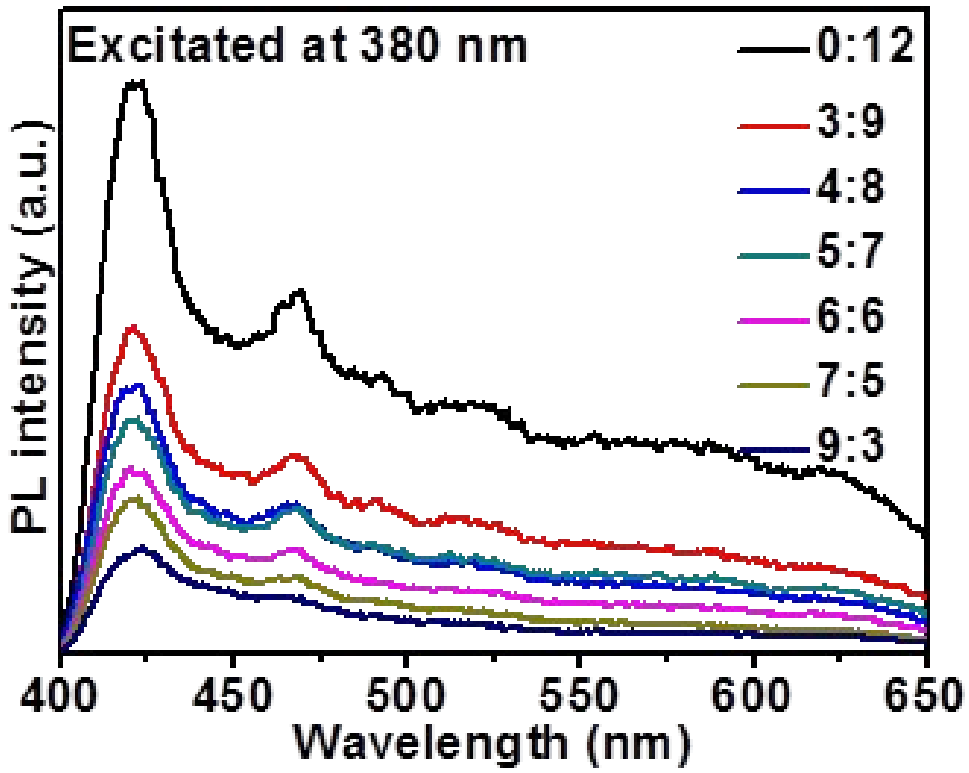

Figure S9. The PL spectra of $SrTiO_3$ (0:12, 3:9, 4:8, 5:7, 6:6, 7:5 and 9:3).

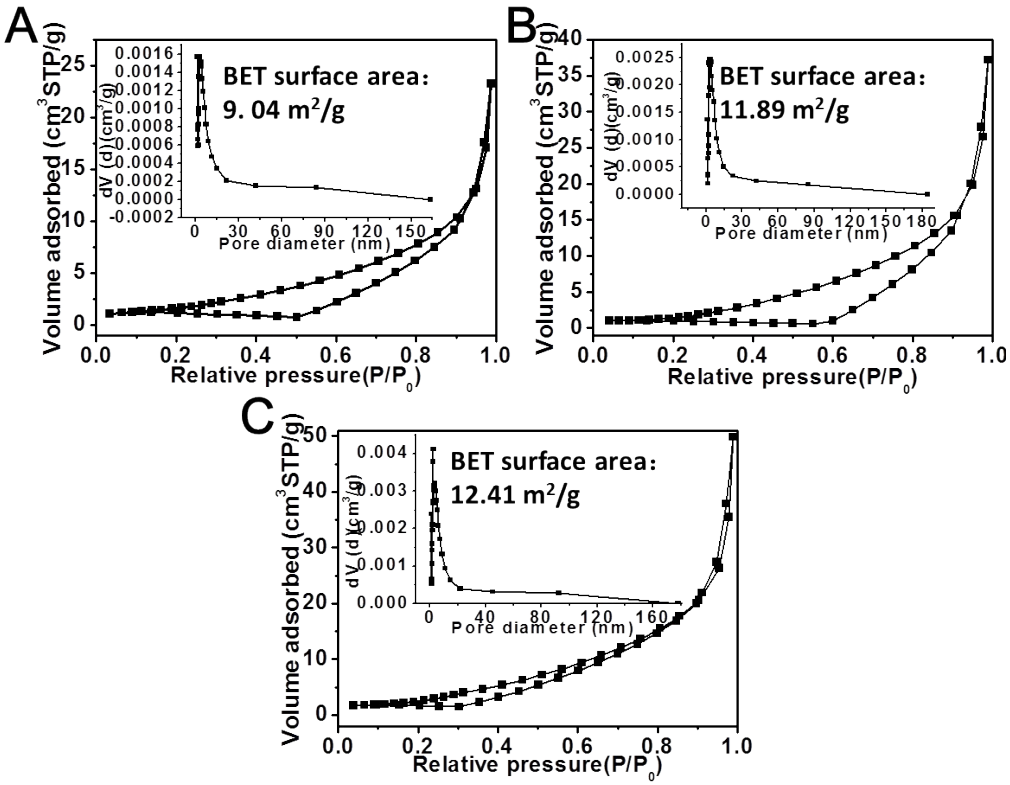

Figure S10. The N_2 adsorption-desorption curves of $SrTiO_3$ 0:12 (A), 5:7 (B) and 9:3 (C). Insets of A, B and C are the pore size distribution curves.

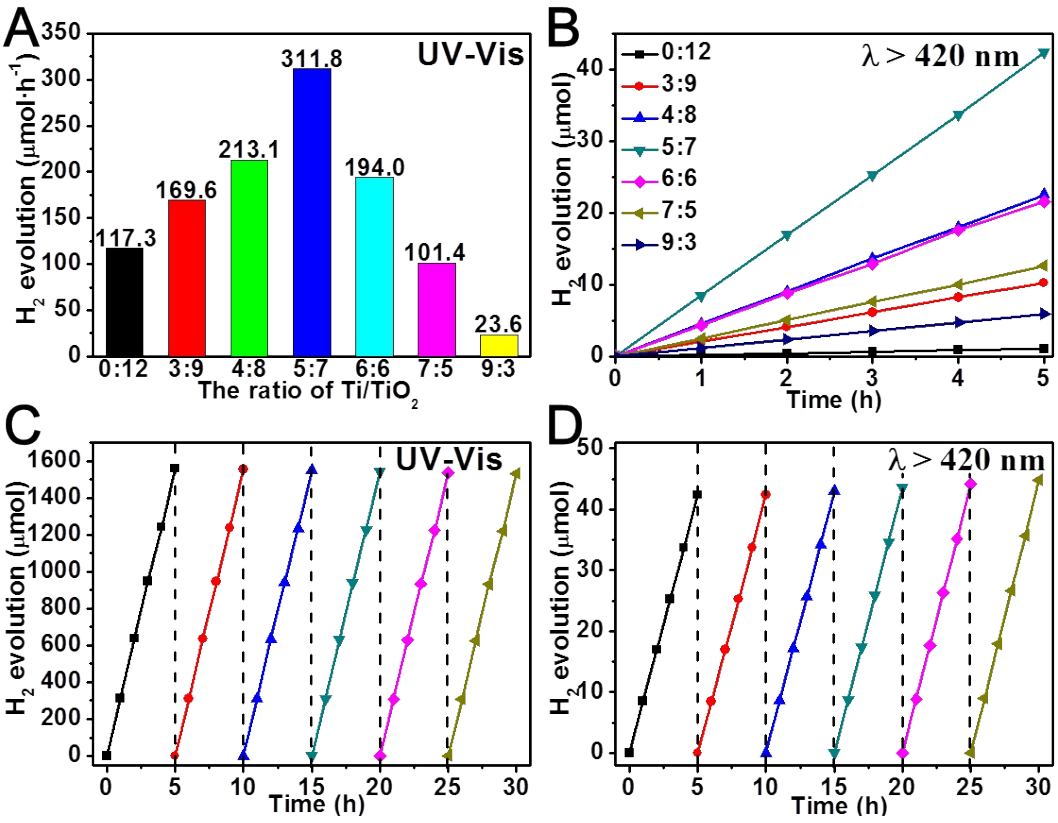

Figure S11. The 50 mg of samples photocatalyst loaded with 1.0 wt% Pt is placed into an aqueous methanol solution (120 mL, 25 voL%) in a closed gas circulation system. The UV-Vis light and visible light irradiation are obtained from a 300 W Xe lamp without and with a UVCUT-420 nm filter. H_2 production rate of $SrTiO_3$ (0:12, 3:9, 4:8, 5:7, 6:6, 7:5 and 9:3) under UV-Vis light irradiation (A). B is the H_2 production under visible light irradiation. The recycling measurements of H_2 production of $SrTiO_3$ 5:7 under UV-Vis light (C) and visible light (D) irradiation.