†Electronic Supplementary Information

Hierarchical mesoporous anatase TiO_2 nanostructures with efficient photocatalytic and photovoltaic performances

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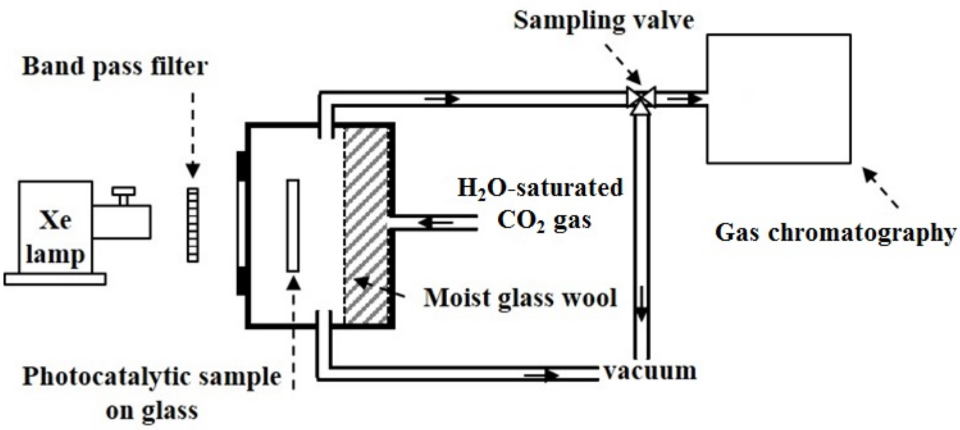

Fig. S1 Illustration of a homemade gas-tight reactor for photocatalytic CO_2 reduction.

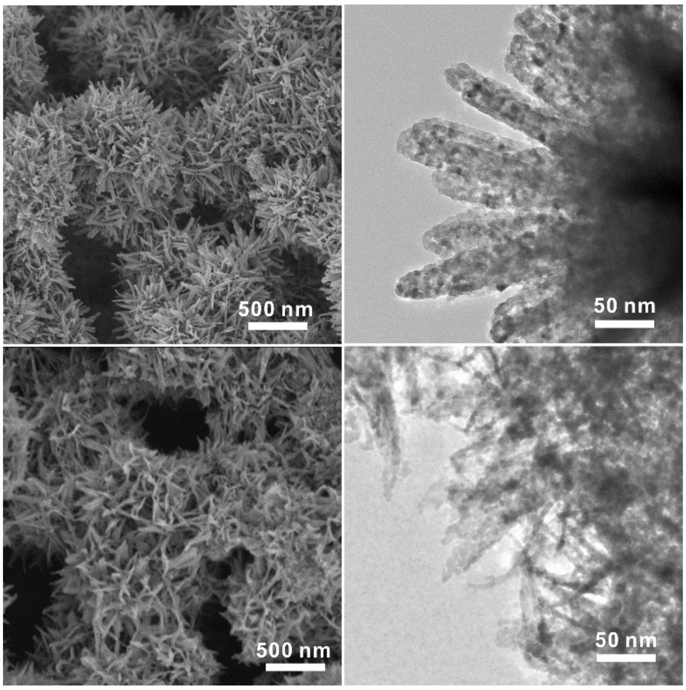

Fig. S2 SEM (left) and TEM (right) images of anatase TiO_2 nanostructures A40 (top) and A85 (bottom).

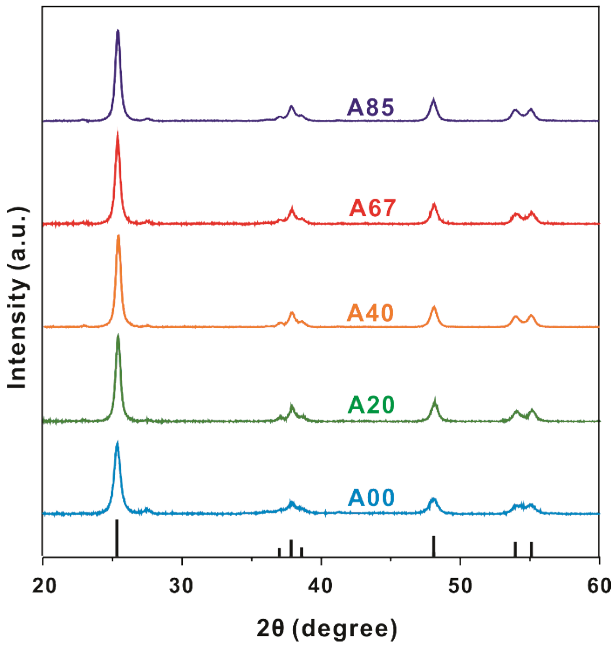

Fig. S3 HRXRD patterns of indicated anatase TiO_2 crystals. The standard diffraction pattern of anatase TiO_2 (JCPDS card no. 84-1286) is also shown in the bottom.

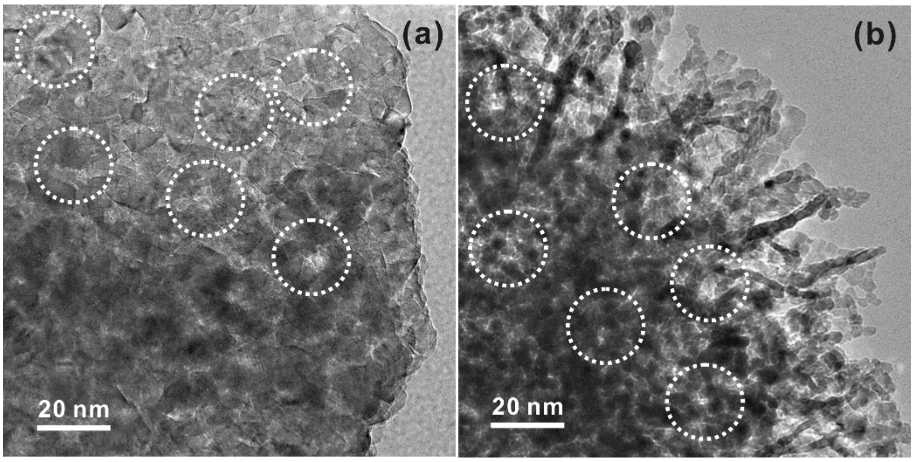

Fig. S4 TEM images of the mesoporous surfaces of anatase TiO_2 nanostructures A20 (a) and A67 (b). Circles indicate multiple pores.

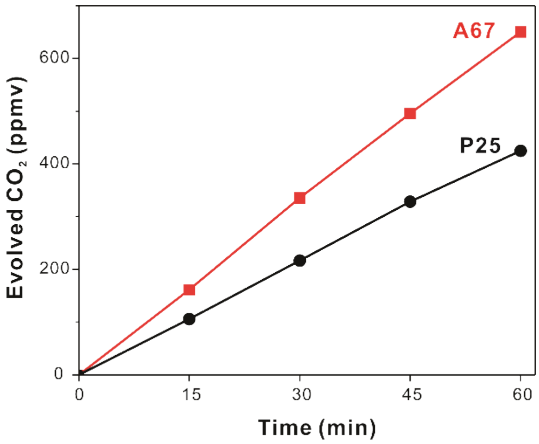

Fig. S5 Photocatalytic oxidation curves of isopropanol by using anatase TiO_2 crystals A67 and commercial TiO_2 Degussa P25. The amounts of evolved CO_2 were monitored from the photocatalytic oxidation of isopropanol as a function of UV-visible irradiation time.

Table S1 Photocatalytic performances of TiO_2 nanostructures

Sample	Evolved CO_2 (ppmv min^{-1})	Evolved CH_3OH (ppmv min^{-1})
A00	1.85	-
A20	8.07	-
A40	9.28	-
A67	10.23	0.31
P25	7.10	0.10

Table S2 Photovoltaic operation parameters of DSSCs without wearing a light mask produced with anatase TiO_2 nanostructures

Sample	V_{oc} (mV)	J_{sc} (mA/cm^2)	Fill Factor (%)	Efficiency (%)
A00	820.92	7.01	68.51	3.95
A20	826.00	7.98	69.05	4.56
A40	827.90	8.77	68.78	4.99
A67	784.61	11.7	69.77	6.39

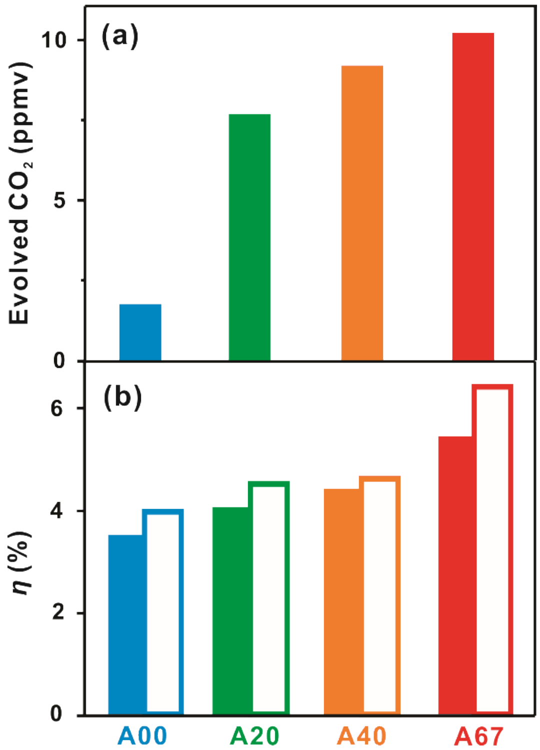

Fig. S6 Photocatalytic (a) and photovoltaic (b) performances of as-synthesized anatase TiO_2 crystals. The amounts of evolved CO_2 were monitored from the photocatalytic oxidation of isopropanol under UV-visible irradiation for 60 min, and the photovoltaic conversion efficiencies (η) of DSSCs were measured with (closed) and without (open) a light-shading mask.

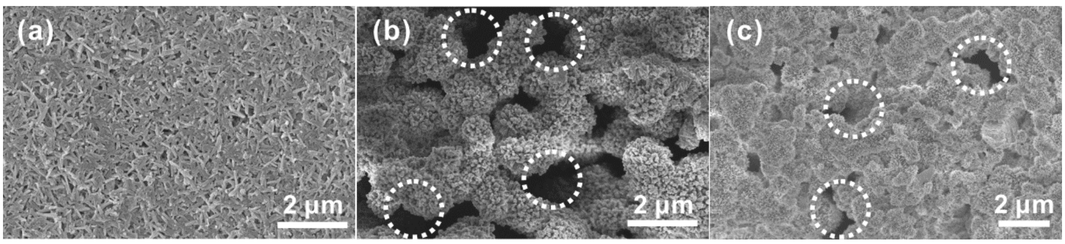

Fig. S7 SEM images of the film surfaces of anatase TiO_2 nanostructures A00 (a), A20 (b), and A67 (c).