Electronic Supplementary Information (ESI)

Self-assembled $CoTiO_3$ nanorods with controllable oxygen vacancy for efficient photochemical reduction of CO_2 to CO

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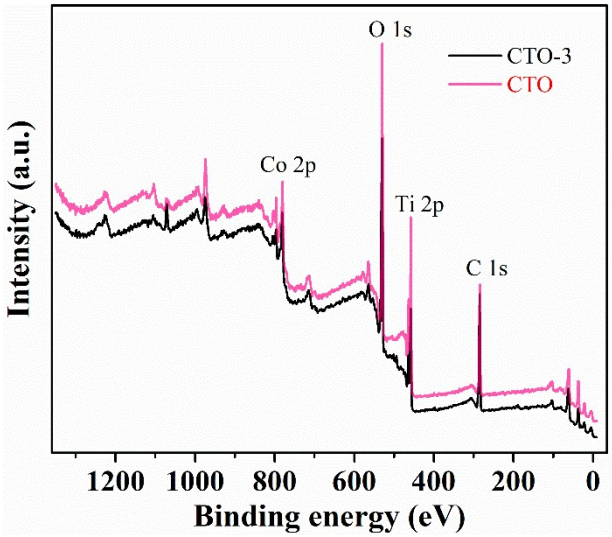

Fig. S1. Survey-scan XPS spectra of $CoTiO_3$ and OV-$CoTiO_3$.

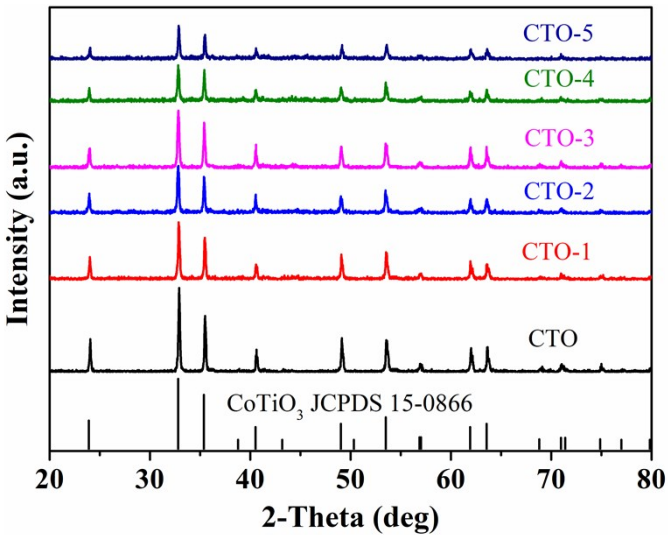

Fig. S2. XRD patterns of OV-CTO and pure CTO.

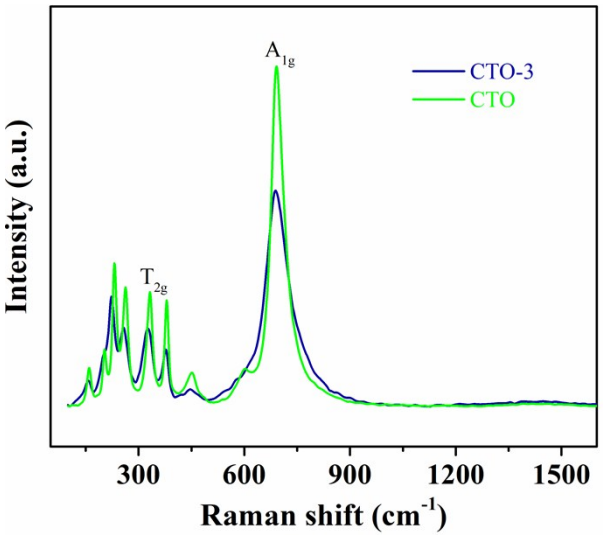

Fig. S3. Raman spectra of CTO and CTO-3 samples.

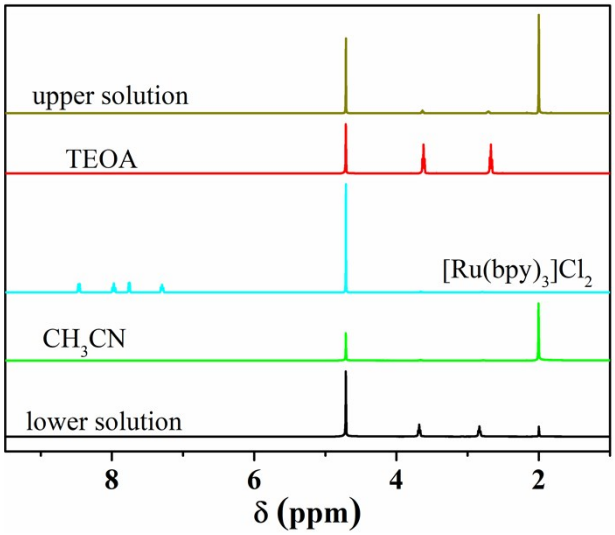

Fig. S4. ^{1}H NMR spectra of TEOA, photosensitizer, CH_3CN and liquid phase substances after photoreduction.

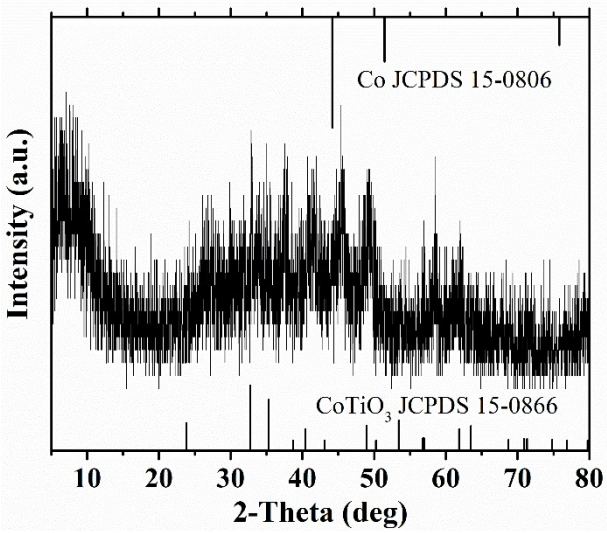

Fig. S5. XRD pattern of OV-CTO (the dosage of $NaBH_4$ is 3 molar equivalent at 550 °C).

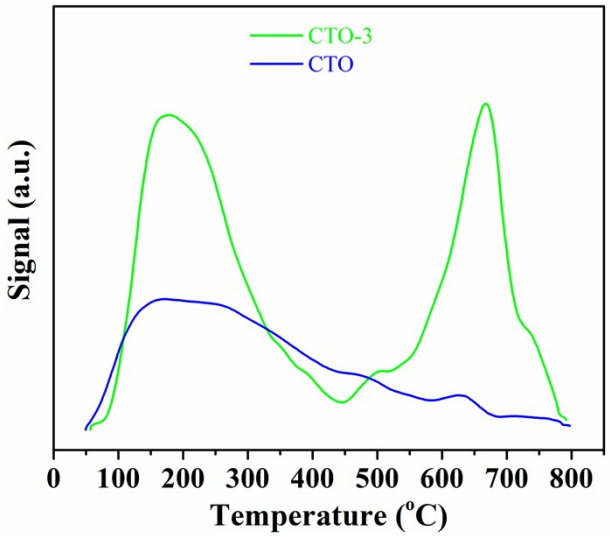

Fig. S6. CO_2-TPD spectra.

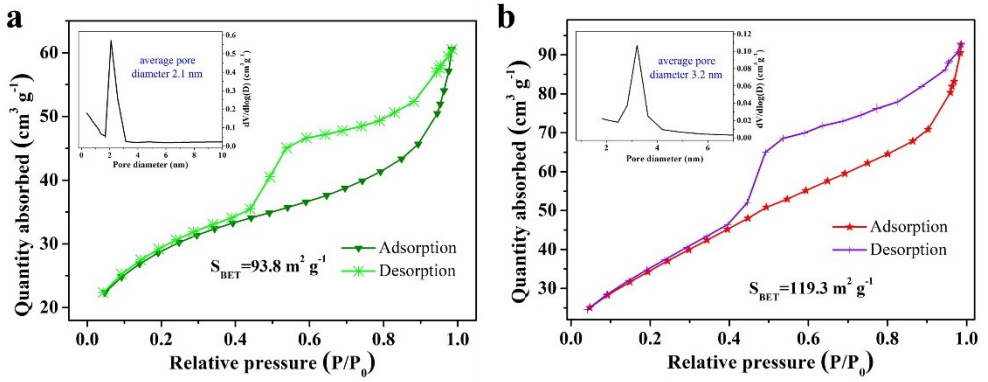

Fig. S7. N_2 adsorption-desorption isotherms and the corresponding pore size distribution (inset) of (a) CTO and (b) CTO-3.

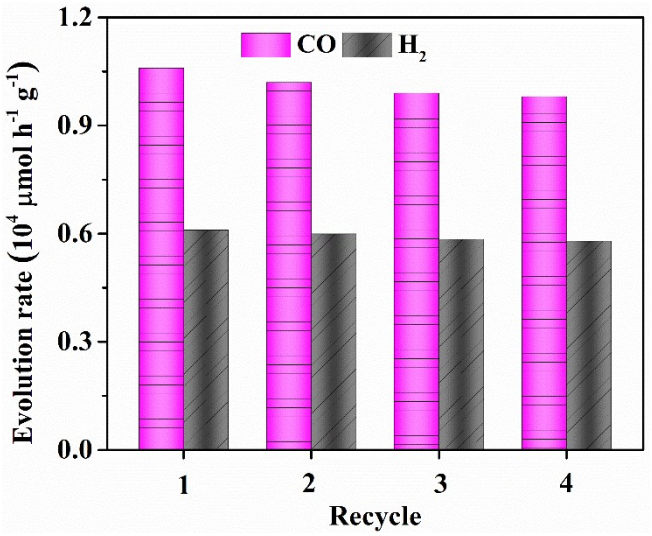

Fig. S8. Recycling test of CTO-3 in photocatalytic CO_2 reduction.

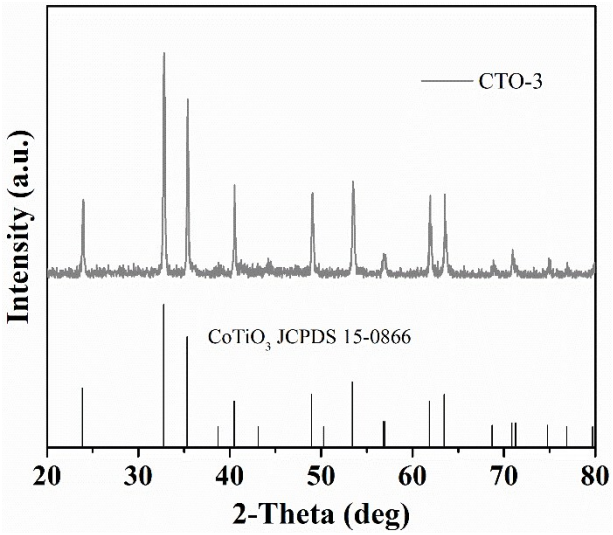

Fig. S9. XRD pattern of recycling CTO-3.

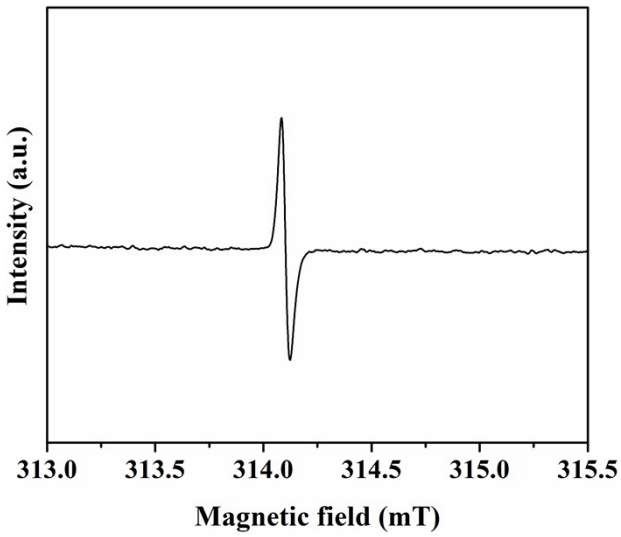

Fig. S10. EPR spectrum of used CTO-3.

Table S1. Control experiments of photocatalytic CO_2 reduction.[a]

Entry	Catalyst/ CTO-3	Photosensitizer/ $[Ru(bpy)_3]Cl_2 \cdot 6H_2O$	CO_2	TEOA	Light	Yield of CO (μmol)	Yield of H_2 (μmol)
1	×	√	√	√	√	0	1.1
2	√	×	√	√	√	0	0.4
3[b]	√	√	×	√	√	0	14.3
4	√	√	√	×	√	0	0
5	√	√	√	√	×	0	0.1
6	√	√	√	√	√	31.8	18.3

[a]Conditions: CTO-3 (1 mg), $[Ru(bpy)_3]Cl_2 \cdot 6H_2O$ (5 mg), acetonitrile : H_2O : TEOA = 4 mL : 1 mL : 1.5 mL in the quartz tube of 55 mL, CO_2 (1 atm), irradiation with white LED lamp at room temperature. [b]Degassed with argon.