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Electronic Supplementary Information

Reinforced photocatalytic reduction of CO_2 to CO by ternary metal oxide $NiCo_2O_4$

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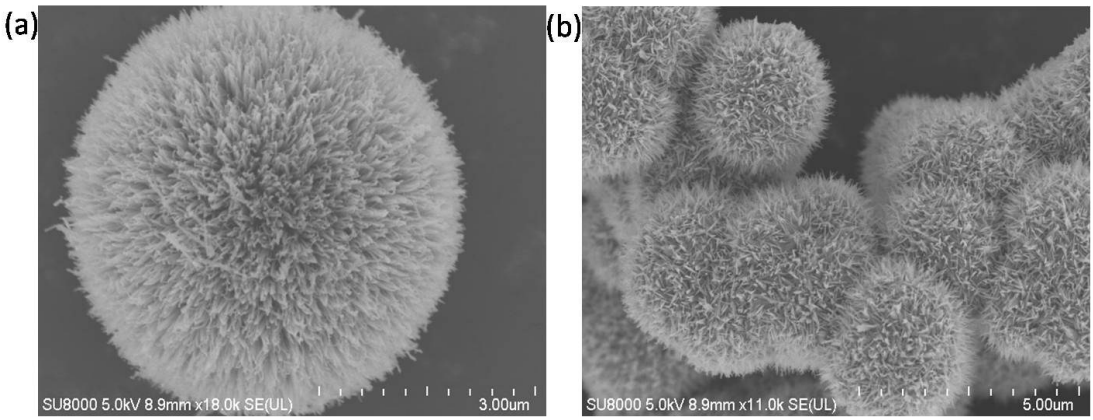

Fig. S1 SEM imagines of $NiCo_2O_4$ spheres.

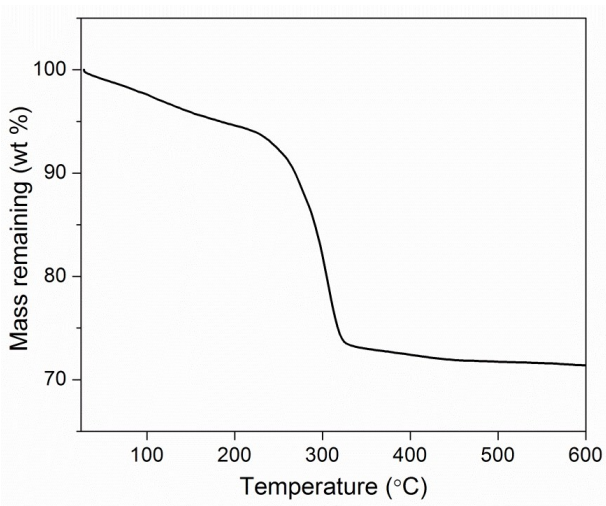

Fig. S2 TGA curve of the $NiCo_2O_4$ precursor.

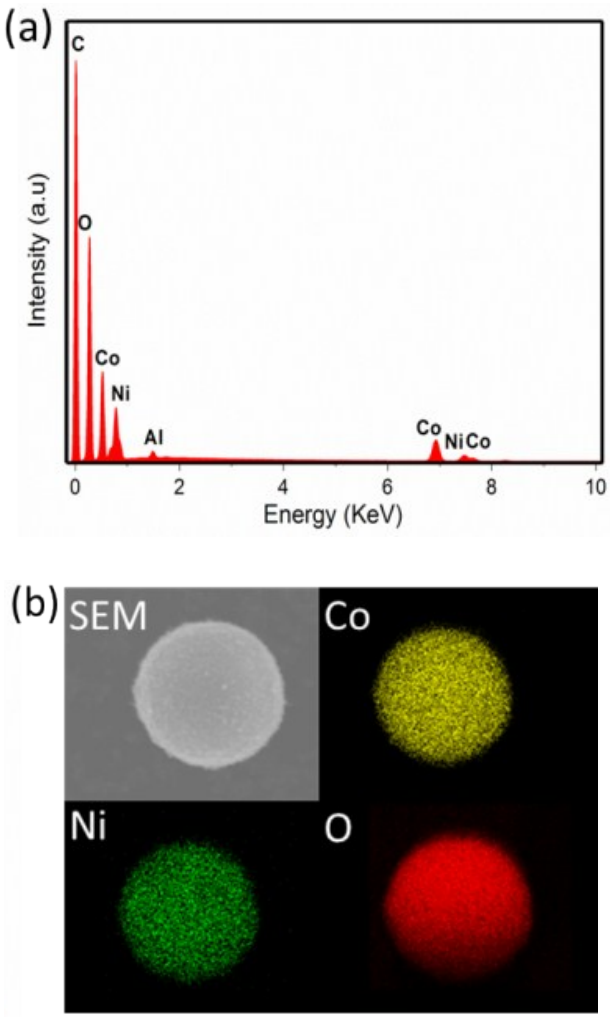

Fig. S3 (a) EDX spectrum and (b) the corresponding EDX-mapping images of the $NiCo_2O_4$ material.

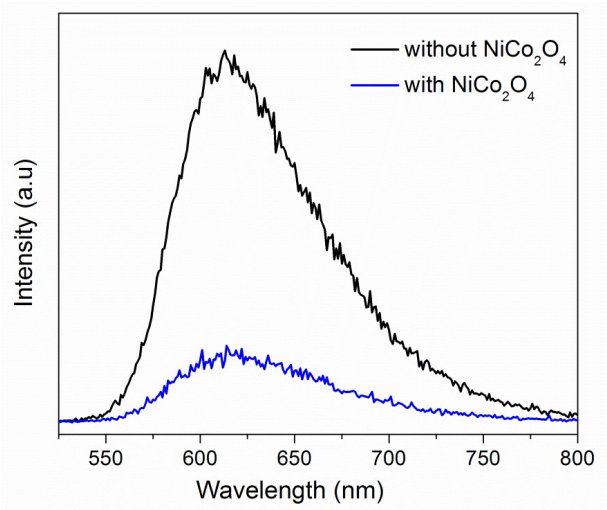

Fig. S4 The photoluminescence (PL) spectra of the photocatalytic CO_2 reduction system with and without $NiCo_2O_4$ as a cocatalyst.

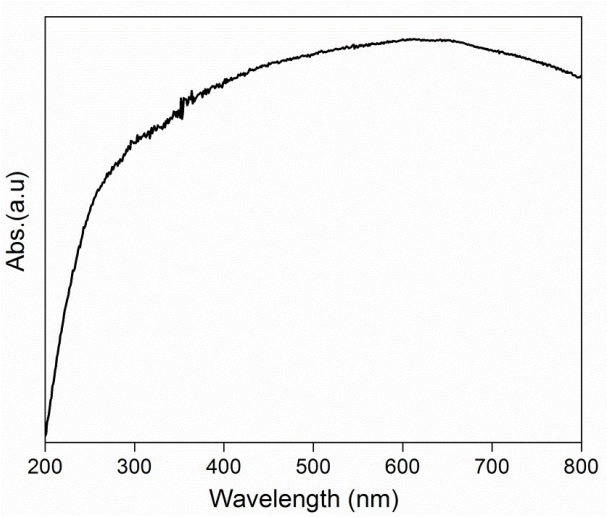

Fig. S5 The UV-vis absorption spectroscopy of $NiCo_2O_4$ solid.

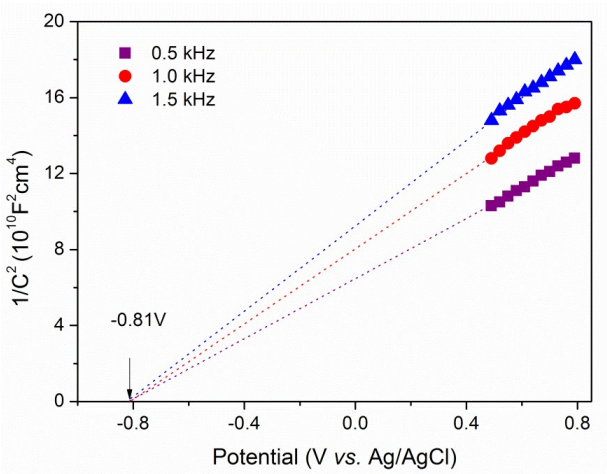

Fig. S6 Mott-Schottky plot of the prepared $NiCo_2O_4$ material.

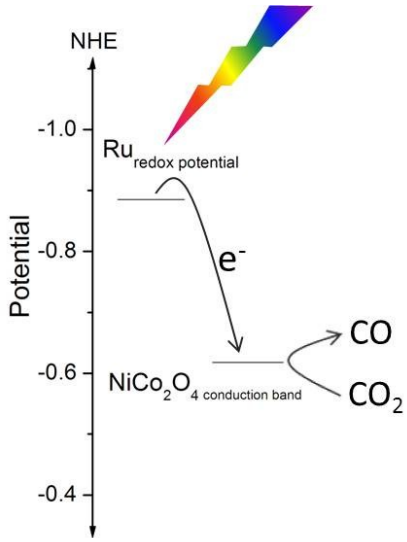

Fig. S7 Energy diagram illustration for the photocatalytic CO_2 reduction reaction.

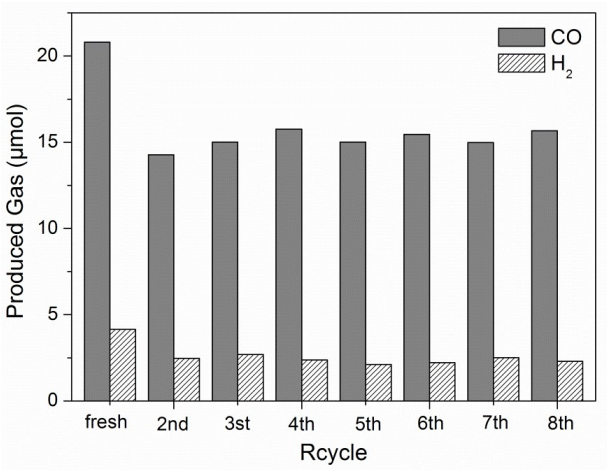

Fig. S8 Reusability test of the $NiCo_2O_4$ cocatalyst.

Table S1 Photocatalytic performance of different catalysts.

Catalyst	CO (μmol)	H_2 (μmol)	$^{a}Sel._{CO}$/ %	ref.
CdS	8	1	88	[1]
$NiCo_2O_4$	21	4	84	This work
$ZnCo_2O_4$	25	9	74	[2]
$MnCo_2O_4$	28	7	80	[3]

[1] Z. Chai, Q. Li, D. Xu, *RSC Adv*., 2014, **4**, 44991.

[2] S. Wang, Z. Ding, X. Wang, *Chem. Commun*., 2015, **51**, 1517.

[3] S. Wang, Y. Hou, X. Wang, *ACS Appl. Mater. Interfaces*, 2015, **7**, 4327.