Electronic Supplementary Material (ESI) for RSC Advances.

Achieving electroreduction of CO_2 to CH_3OH with high selectivity by pyrite-nickel sulfide nanocomposite

Supporting information

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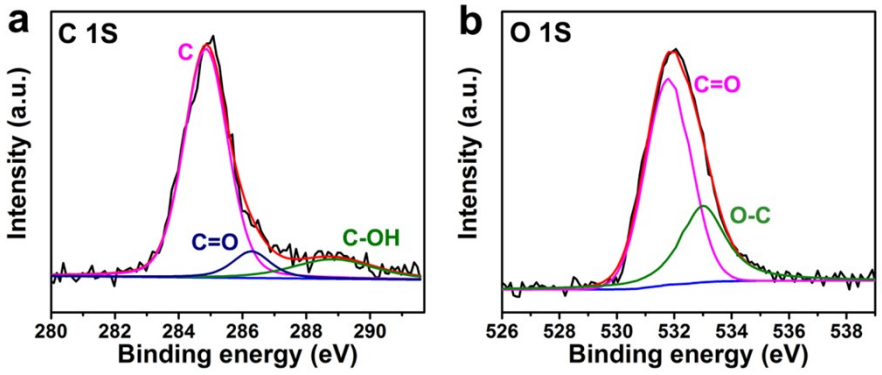

Figure S1. The high-resolution XPS spectra of (a) C 1s and (b) O 1s.

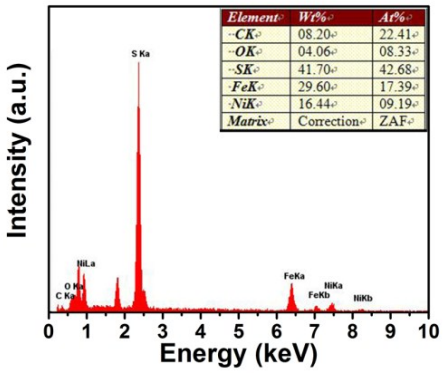

Figure S2. The EDX spectrum of FeS_2/NiS nanocomposite.

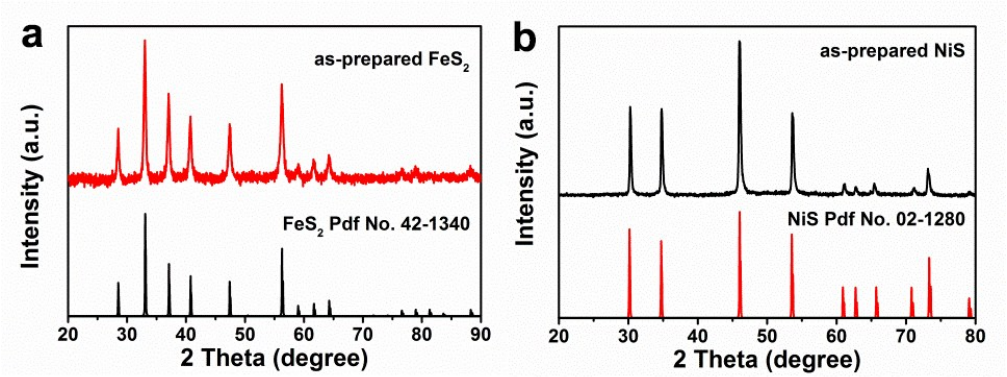

Figure S3. The large-angle XRD patterns of (a) FeS_2 and (b) NiS nanocrystals.

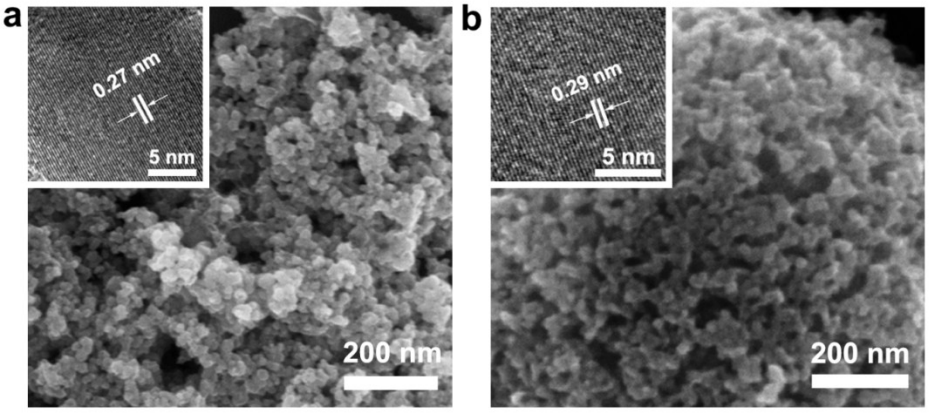

Figure S4. (a) The SEM image of FeS_2 nanocrystals and the HRTEM image of FeS_2 nanocrystals (inset). (b) The SEM image of NiS nanocrystals and the HRTEM image of NiS nanocrystals (inset).

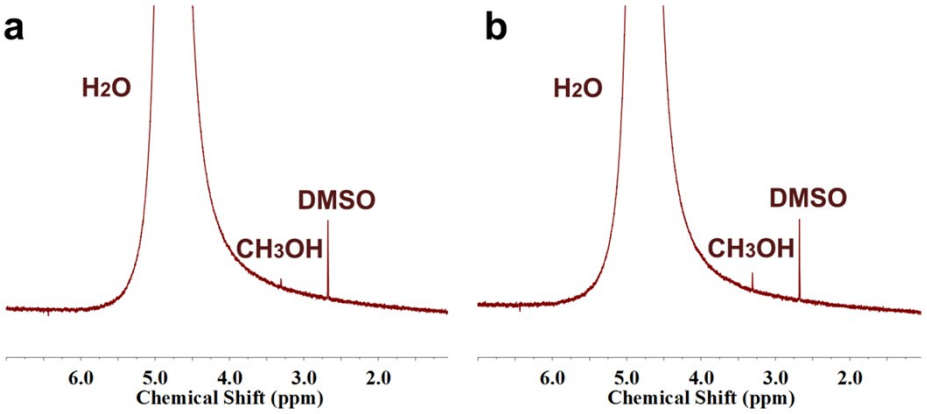

Figure S5. ^{1}H-NMR spectra of the electrolytes after (a) 2 h and (b) 4 h CO_2 electroreduction at -0.6 V *vs.* RHE for the FeS_2/NiS nanocomposite.

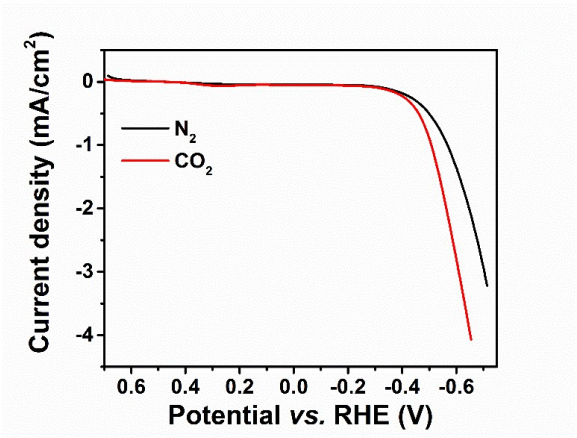

Figure S6. LSVs for physical mixture of FeS_2 and NiS nanocrystals in 0.5 M $KHCO_3$ aqueous solution under N_2 (blue trace) and CO_2 (red trace) atmosphere.

Table S1. Summary of electrode/electrocatalysts for selectively reducing CO_2 to CH_3OH.

No.	Electrode/electrocatalysts	Electrode Potential (V)	Faradaic Efficiency (%)	Ref.
1	FeS_2/NiS nanocomposite	-1.3 V vs. SCE	64	This work
2	Ru	-0.54 V vs. SCE	42	1
3	Ru/Cu	-0.8 V vs. SCE	41.3	2
4	Cu	-1.1 vs. SCE	40	3
5	RuO_2–TiO_2	-0.95 vs. SCE	30	4
6	Platinum plate electrode $KFe^{II}[Fe^{II}(CN)_6]$		>80	5
7	Electrodeposited cuprous oxide film	-1.1 vs. SCE	38	6
8	RuO_2–TiO_2 nanotube (NT) composite electrodes		60.5	7
9	p-GaP	-1.4 V vs. SCE	60	8
10	p-InP		70	9
11	p-GaAs	-1.3 V vs. SCE	55	9

Reference:

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