Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

Interface engineering in core-shell Co_9S_8@MoS_2 nanocrystals induces enhanced hydrogen evolution in acidic and alkaline media

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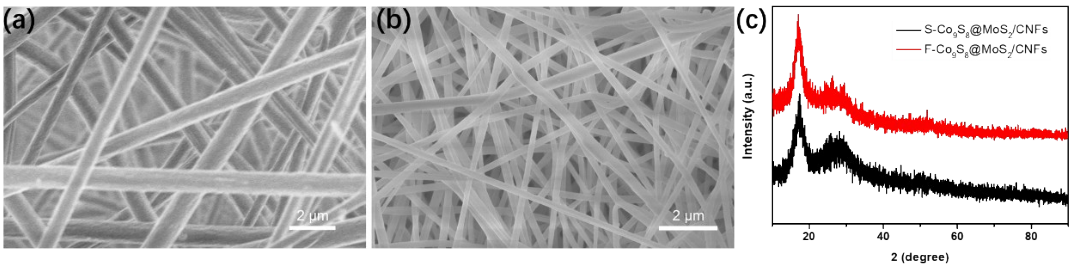

Figure S1. SEM images of PAN/CoMo precursor nanofibers of F-Co_9S_8@MoS_2/CNFs (a) and S-Co_9S_8@MoS_2/CNFs (b). (c) XRD patterns of PAN/CoMo precursor nanofibers of F-Co_9S_8@MoS_2/CNFs and S-Co_9S_8@MoS_2/CNFs.

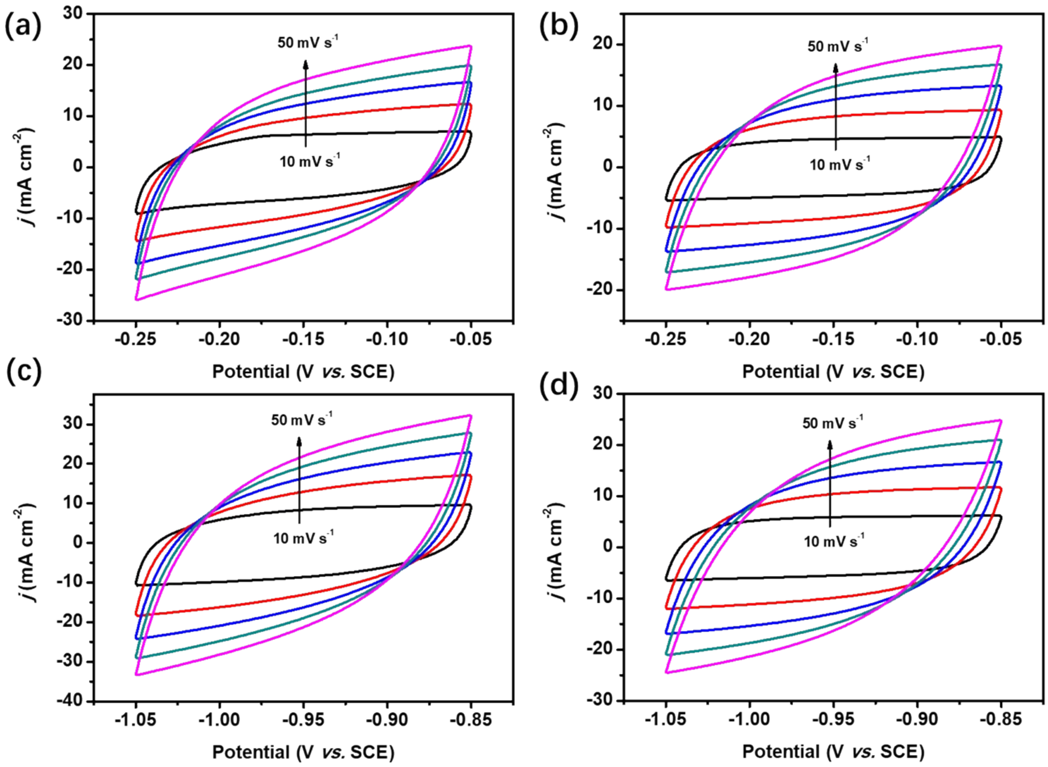

Figure S2. Electrochemical cyclic voltammograms curves of S-Co_9S_8@MoS_2/CNFs and F-Co_9S_8@MoS_2/CNFs in 0.5 M H_2SO_4 (a, b) and 1.0 M KOH (c, d) at scan rates of 10, 20, 30, 40, and 50 mV s^{-1}.

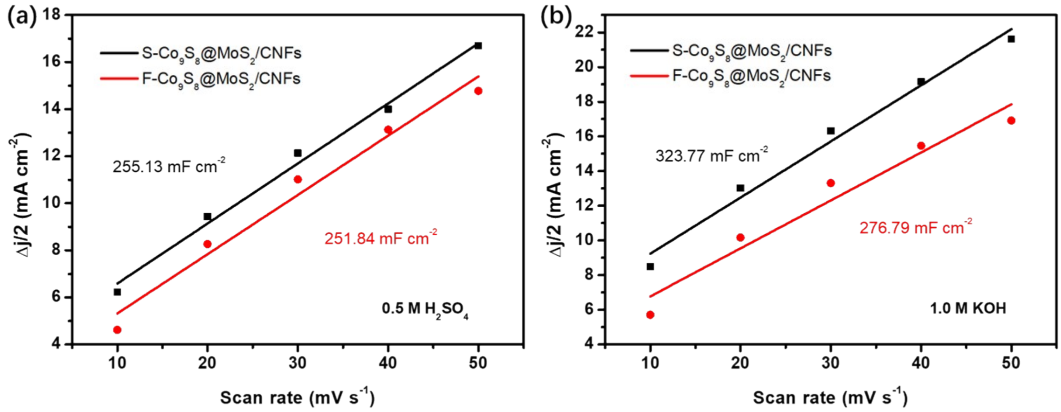

Figure S3. Calculation of C_{dl} by plotting Capacitive currents (Δ *j*) against scan rates in 0.5 M H_2SO_4 (a) or 1.0 M KOH (b).

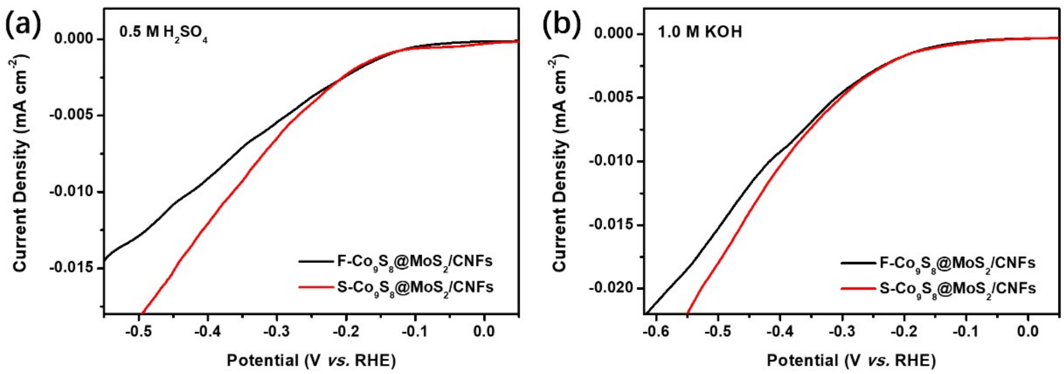

Figure S4. Polarization curves of F-Co_9S_8@MoS_2/CNFs and S-Co_9S_8@MoS_2/CNFs normalized by ECSA in 0.5 M H_2SO_4 (a) or 1.0 M KOH (b).

Table S1. Comparison of sulfide-based electrocatalysts.

Catalysts	Electrolyte	η_{10} (mA cm^{-2})	η_{100} (mA cm^{-2})	Tafel Slope (mV dec^{-1})	Refence
Co_9S_8/MoS_x nanotubes	0.5 M H_2SO_4	161	/	78	[1]
Co_9S_8@MoS_2 HNBs	0.5 M H_2SO_4	106	/	51.8	[2]
Co_9S_8@MoS_2 hybrids	0.5 M H_2SO_4	171	/	123	[3]
	1.0 M KOH	143	/	117	
Co_9S_8-30@MoS_x/CC	0.5 M H_2SO_4	98	165	64.8	[4]
MoS_2/Ni_3S_2	1.0 M KOH	110	/	83.1	[5]
CoMoS-2-C	0.5 M H_2SO_4	135	/	50	[6]
Hollow CoS_x@MoS_2 microcubes	0.5 M H_2SO_4	239	/	103	[7]
Co_9S_8/NC@MoS_2	0.5 M H_2SO_4	117	/	68.8	[8]
	1.0 M KOH	67	/	60.3	
	1.0 M PBS	261	/	126.1	
Co_9S_8-MoS_2@3DC	0.5 M H_2SO_4	230	/	111.7	[9]
	1.0 M KOH	177	/	83.6	
	1.0 M PBS	474	/	172	
Co_9S_8/1L MoS_2	0.5 M H_2SO_4	97	/	71	[10]
Co_9S_8/CNFs	0.5 M H_2SO_4	165	/	83	[11]
$Pd_{16}S_7$/MoS_2/CNFs	0.5 M H_2SO_4	83	/	113	[12]
Co_9S_8@MoS_2/CNFs	0.5 M H_2SO_4	190	/	110	[13]
Co_9S_8 HMs-140/C	0.1 M KOH	250	/	98	[14]
Co_9S_8/HWS_2/CNFs	0.5 M H_2SO_4	83	235	56	[15]
	1.0 M KOH	87	375	72	
S-Co_9S_8@ MoS_2/CNFs	0.5 M H_2SO_4	77	236	83	This work
	1.0 M KOH	122	322	66	

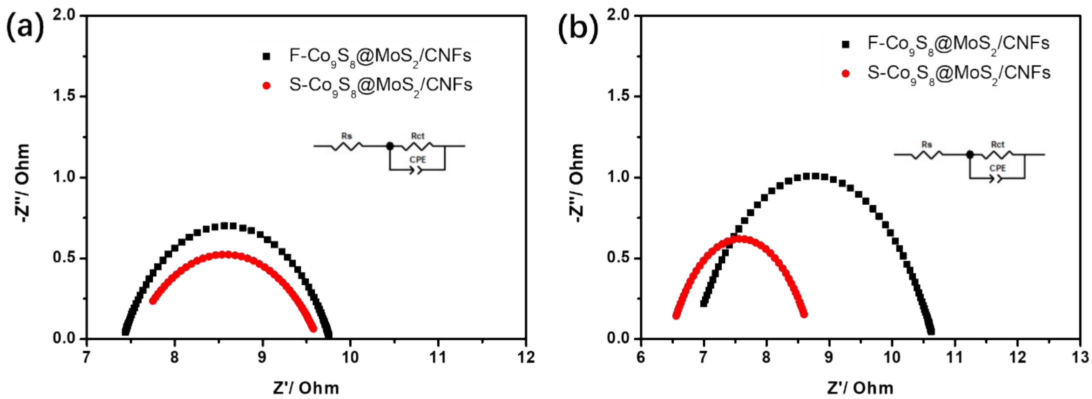

Figure S5. The Nyquist plots of F-Co_9S_8@MoS_2/CNFs and S-Co_9S_8@MoS_2/CNFs in 0.5 M H_2SO_4 (a) and 1.0 M KOH (b) at η = 10 mV.

Table S2. R_{ct} values of F-Co_9S_8@MoS_2/CNFs and S-Co_9S_8@MoS_2/CNFs in 0.5 M H_2SO_4 and 1.0 M KOH at η = 10 mV.

R_{ct}	F-Co_9S_8@MoS_2/CNFs	S-Co_9S_8@MoS_2/CNFs
0.5 M H_2SO_4	2.36	2.11
1.0 M KOH	3.83	2.26

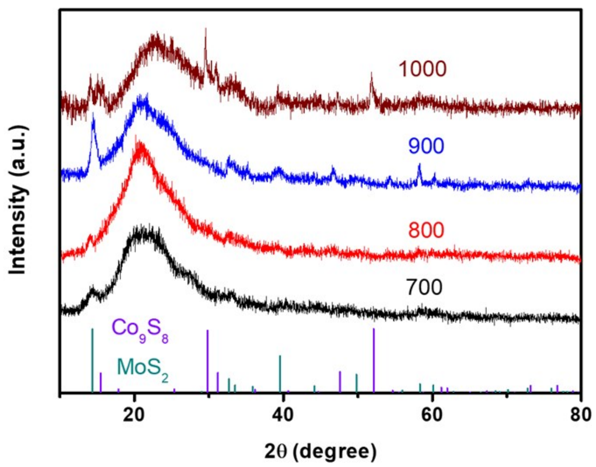

Figure S6. XRD patterns of the S-Co_9S_8@MoS_2/CNFs prepared at different temperatures.

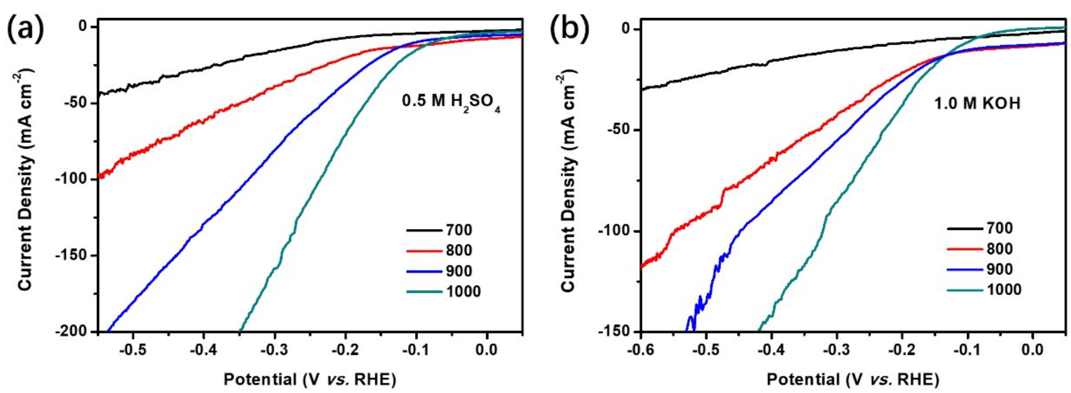

Figure S7. HER LSV curves of S-Co_9S_8@MoS_2/CNFs prepared at different temperatures obtained in (a) 0.5 M H_2SO_4 and (b) 1.0 M KOH.

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