Supporting Information

Ruthenium doped cobalt sulphide electrocatalyst derived from ruthenium-cobalt Prussian blue analogue (RuCo-PBA) for enhanced hydrogen evolution reaction (HER)

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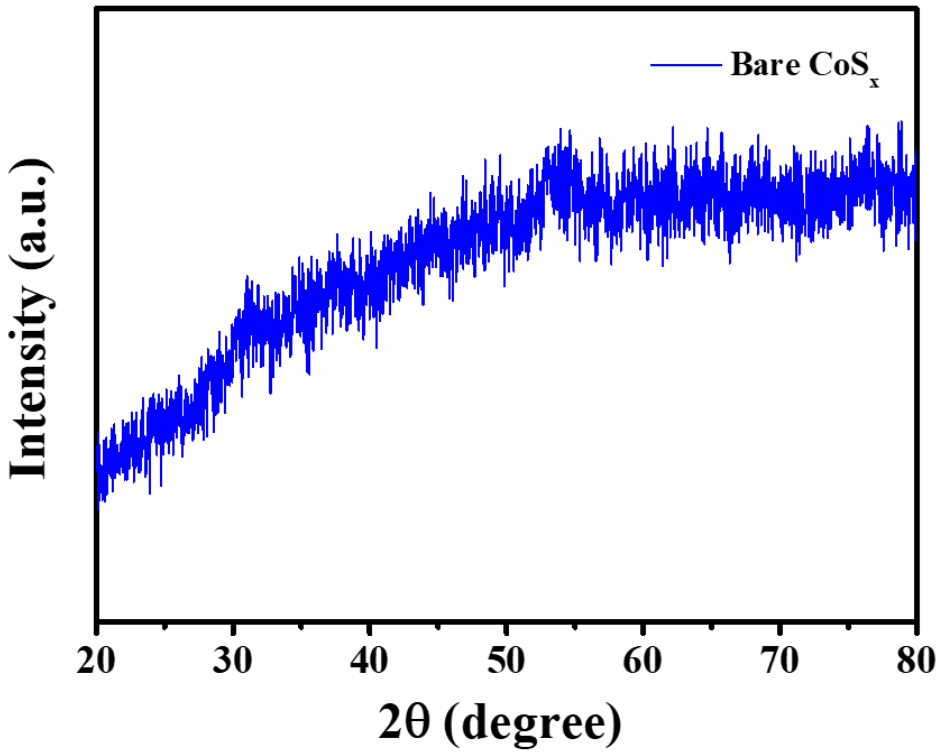

Fig. S1: Powder X-ray diffraction study of bare CoS_x.

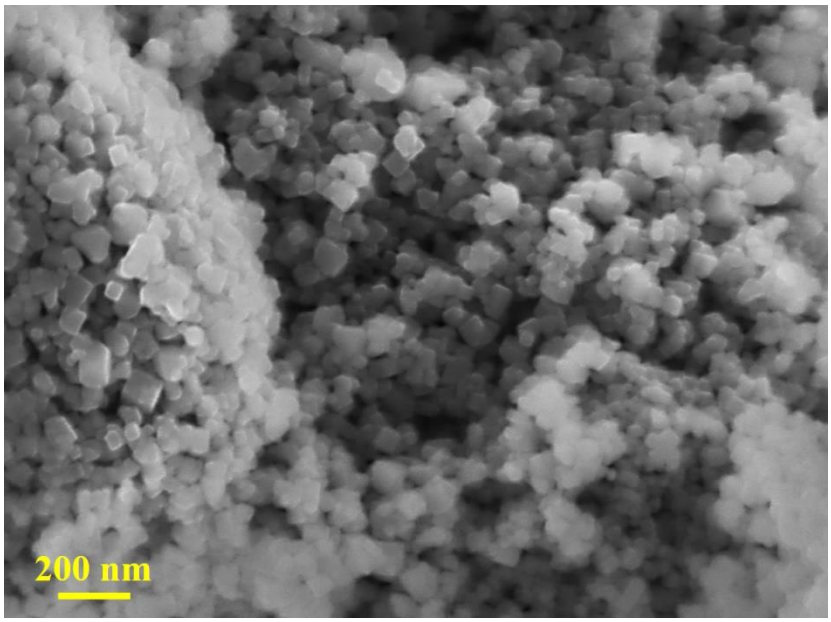

Fig. S2: FESEM image of RuCo-PBA.

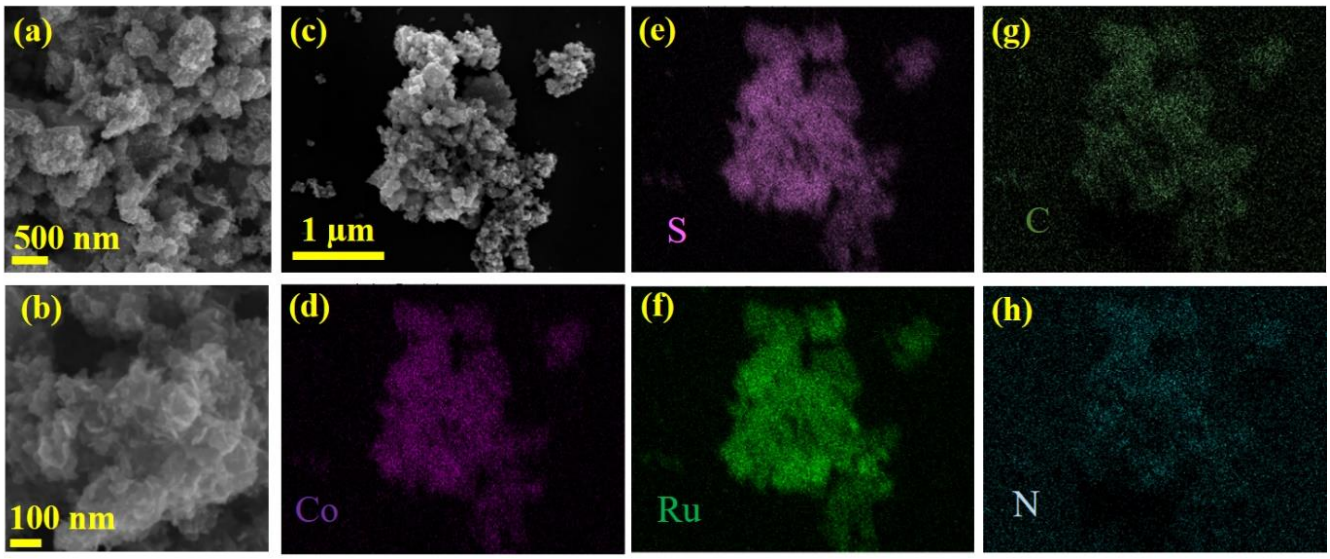

Fig. S3: FESEM images of Co_9S_8/Ru@24H at different scales (a-c) and elemental mapping of Co_9S_8/Ru@24H (d-h).

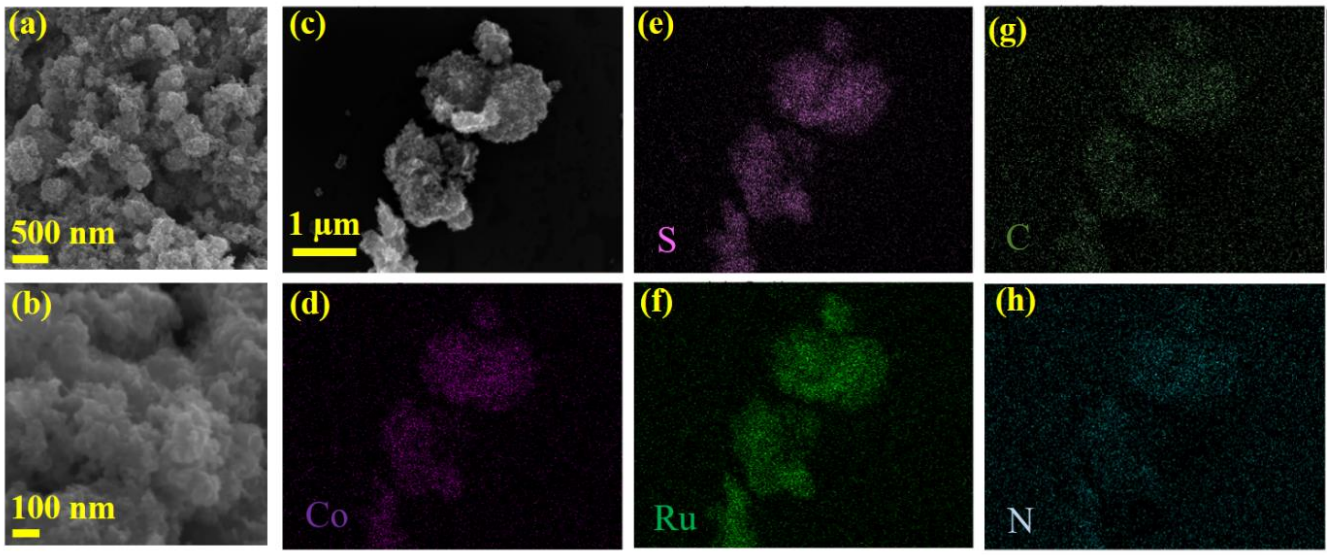

Fig. S4: FESEM images of Co_9S_8/Ru@72H at different scales (a-c) and elemental mapping of Co_9S_8/Ru@72H (d-h).

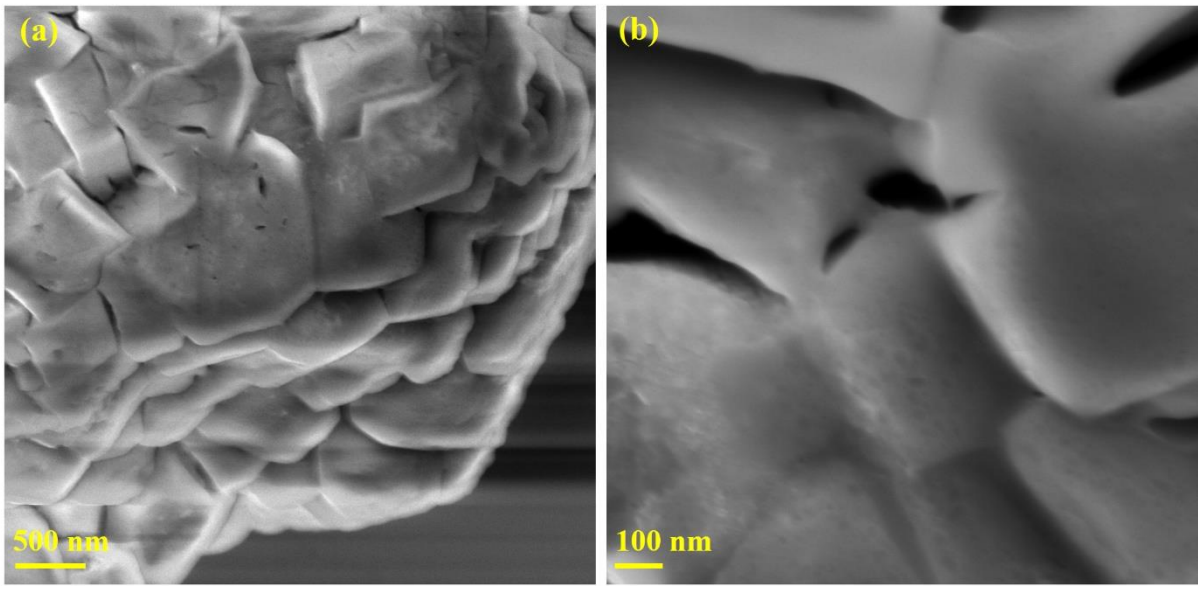

Fig. S5: FESEM images of CoS_x at different scales (a & b).

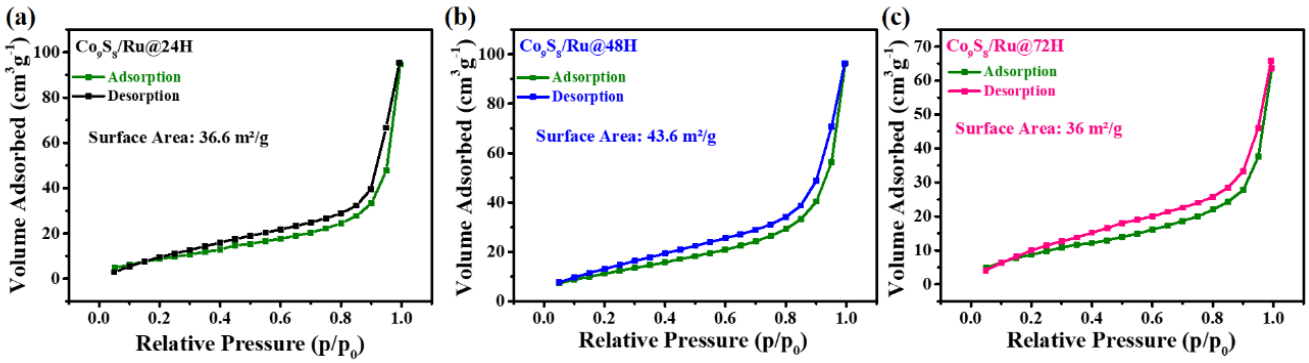

Fig. S6: Nitrogen adsorption desorption isotherm for Co_9S_8/Ru@24H (a), Co_9S_8/Ru@48H (b) and Co_9S_8/Ru@72H (c).

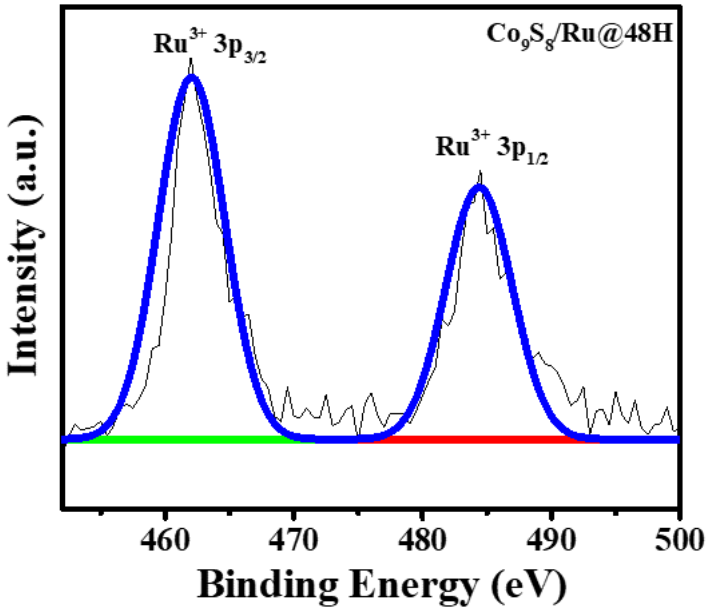

Fig. S7: XPS spectrum of Ru 3p in Co_9S_8/Ru@48H.

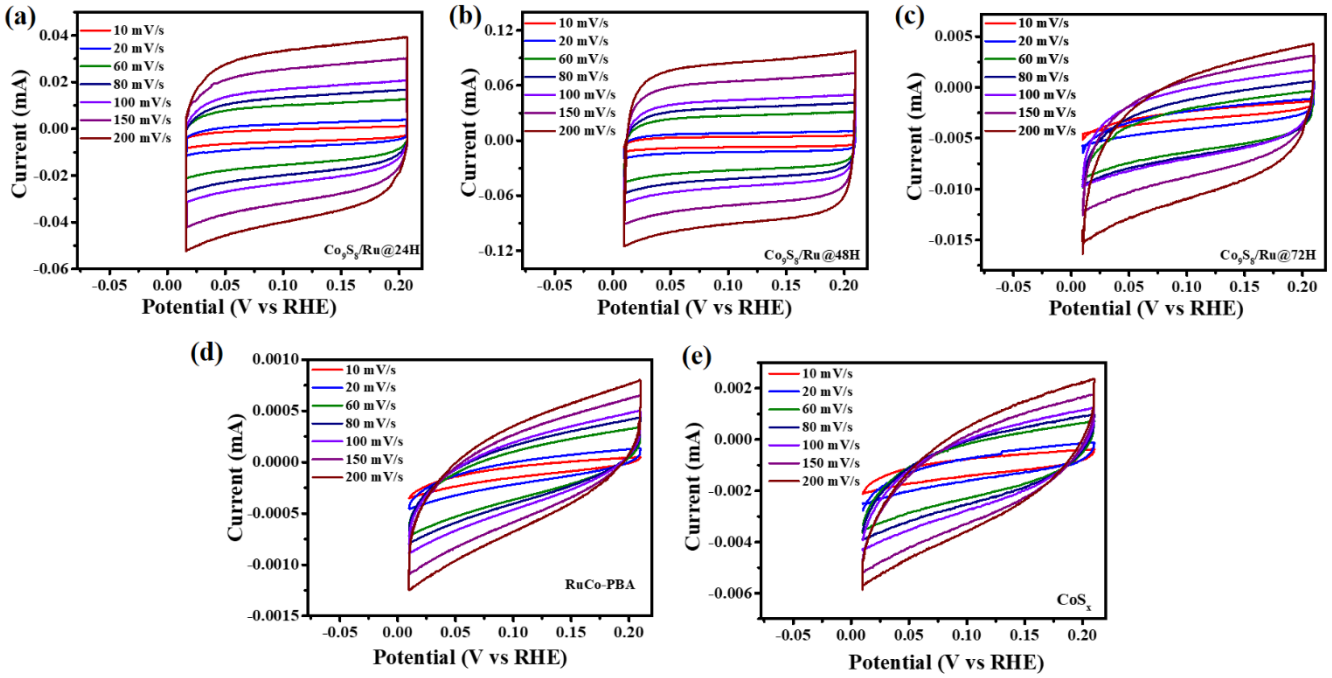

Fig. S8: Cyclic voltammograms (CVs) of Co_9S_8/Ru@24H (a), Co_9S_8/Ru@48H (b), Co_9S_8/Ru@72H (c), RuCo-PBA (d) and bare CoS_x (e).

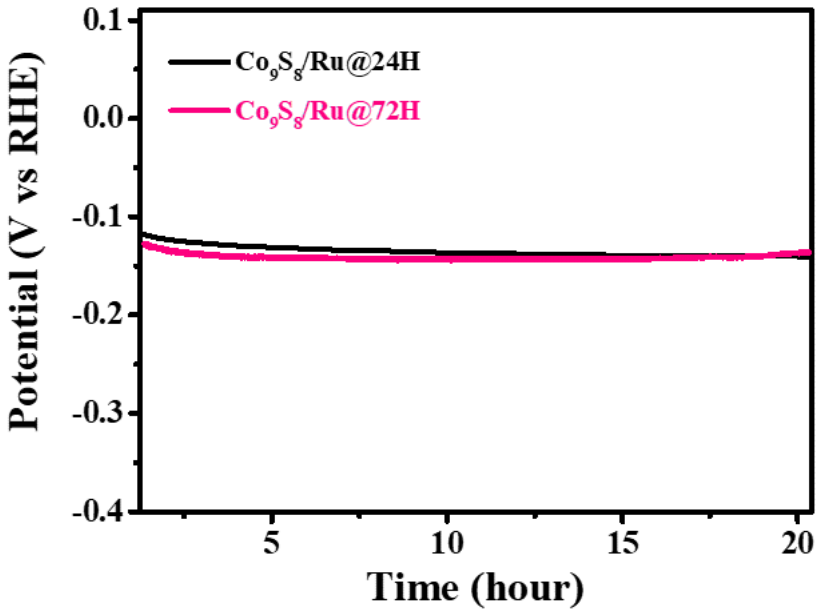

Fig. S9: Chronopotentiometry test of Co_9S_8/Ru@24H and Co_9S_8/Ru@72H in 0.5 M H_2SO_4 acidic solution.

Table S1: Comparison of metal sulphide-based electrocatalysts for HER.

	Overpotential at 10 mA cm^{-2} (mV)	**Tafel slope (mV dec^{-1})**	**Electrolyte**	**References**
Co_9S_8-30@MoS_x/CC	98	64.8	0.5 M H_2SO_4	1
Co_9S_8-NDCL	149@20mA cm^{-2}	70	0.5 M H_2SO_4	2
Co_9S_8/NC@MoS_2	117	68.8	0.5 M H_2SO_4	3
MoS_2/Co_9S_8/MoC@CNT-N	174.2	84.7	0.5 M H_2SO_4	4
CoS_2 nanowires	145	51.6	0.5 M H_2SO_4	5
Co_XS_Y	188	96	0.5 M H_2SO_4	6
Co_9S_8@MoS_2	106	51.8	0.5 M H_2SO_4	7
Zn-Co_9S_8@CF-(1-1)	278	85.2	0.5 M H_2SO_4	8
Co_9S_8/Ru@48H	94	84	0.5 M H_2SO_4	This work

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