Supporting Information (SI) for:

Well-dispersed CoS_2 nano-octahedra grown on carbon fibre network as efficient electrocatalysts for hydrogen evolution reaction

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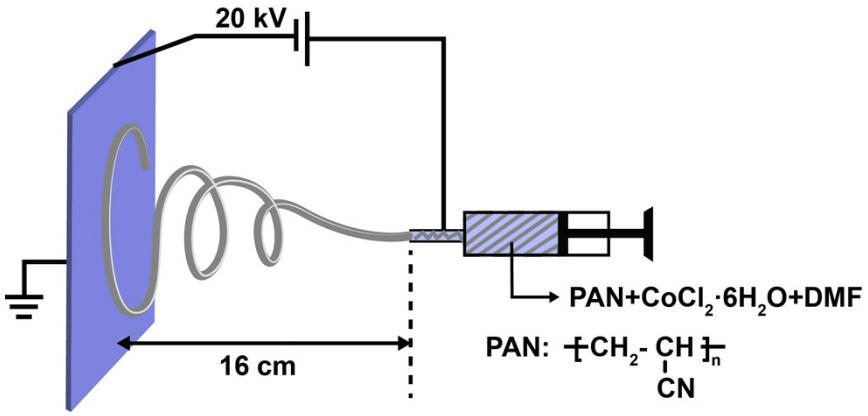

Figure S1. Schematic illustration of the electrostatic spinning technique.

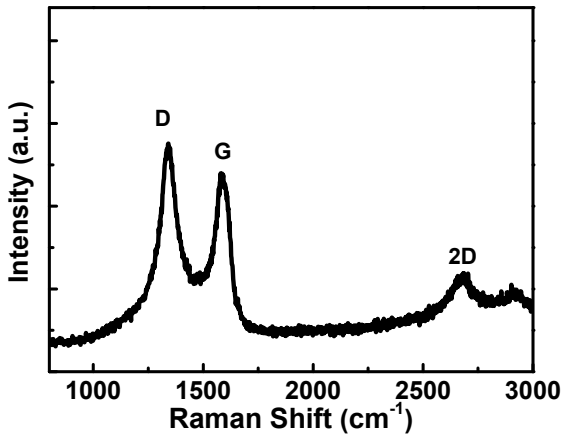

Figure S2. Raman spectrum of Co-CFN.

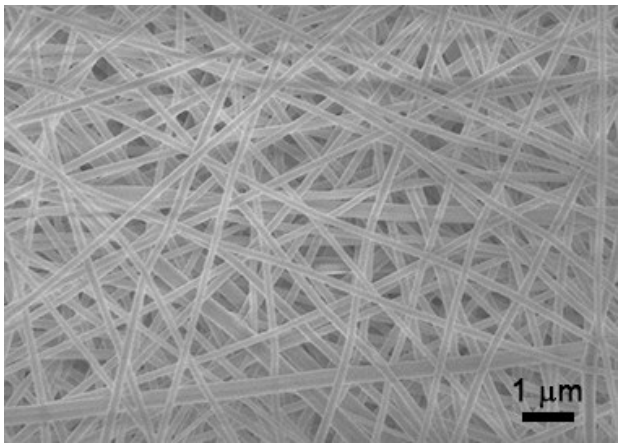

Figure S3. SEM image of Co^{2+}-PANF.

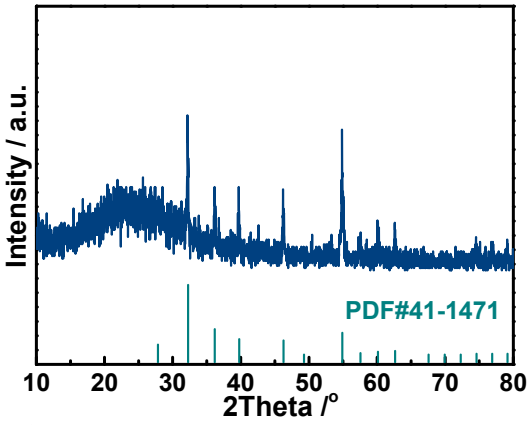

Figure S4. XRD pattern of Agg-CoS_2.

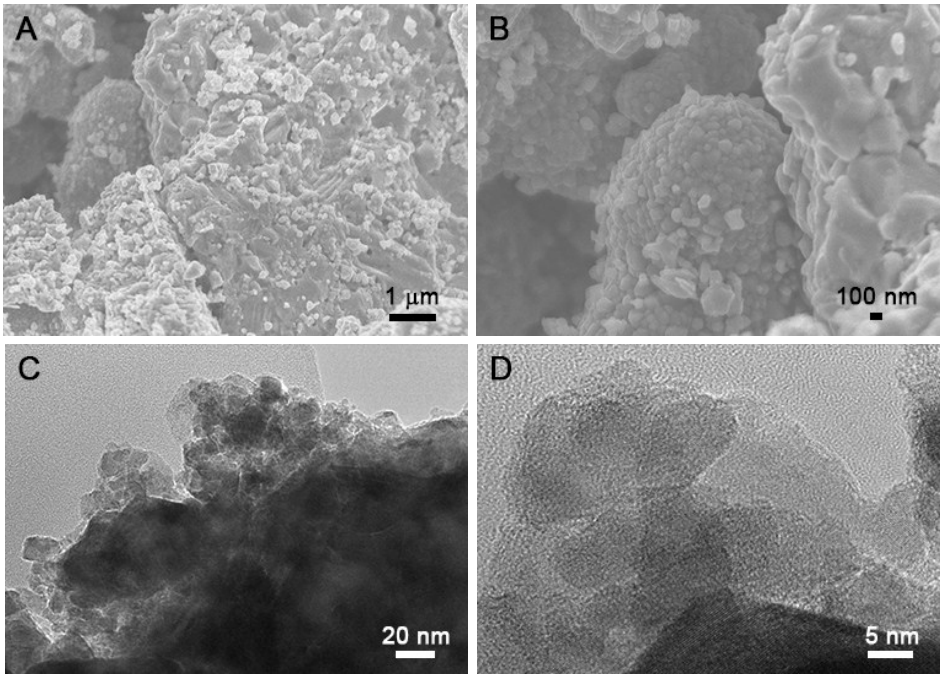

Figure S5. (A,B) SEM images and (C,D) TEM images of Agg-CoS_2.

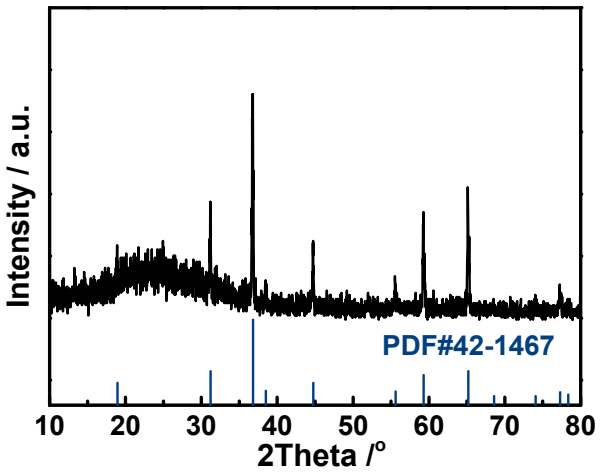

Figure S6. XRD pattern of the final product collected after thermal treatment at 750 °C, which is indexed as Co_3O_4 (PDF#42-1467).

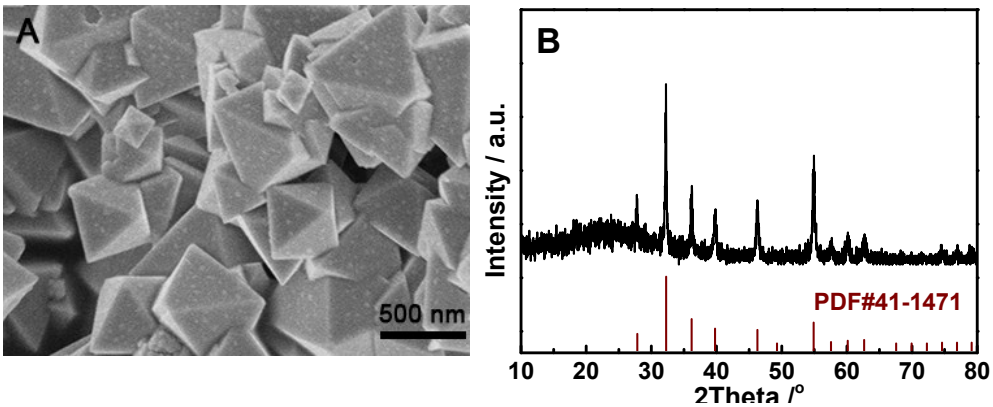

Figure S7. (A) SEM image and (B) XRD pattern of CoS_2-Oct.

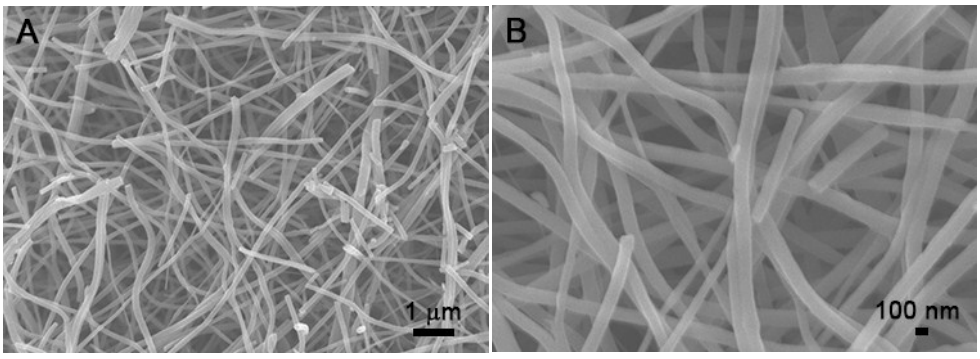

Figure S8. (A,B) SEM images of CFN.

Table S1. Comparison of the electrocatalytic activity of CoS_2-CFN vis-à-vis the CoS_2 based solid-state catalysts reported recently for HER.

Catalyst	Catalysis condition	Mass Loading of active component (mg/cm^2)	Current density (*j*)	Overpotential at the corresponding *j*	Reference
CoS_2-CFN	**0.5 M H_2SO_4**	**0.05**	**10 mA/cm^2**	**136 mV**	**This work.**
CoS_2 nanopyramid	0.5 M H_2SO_4	0.625	10 mA/cm^2	70 mV	*J. Mater. Chem. A,* **2015**, *3,* 6306-6310.
MoS_2/CoS_2/CC CoS_2/CC	0.5 M H_2SO_4 0.5 M H_2SO_4	18.6 16.5	10 mA/cm^2 10 mA/cm^2	87 mV 288 mV	*J. Mater. Chem. A*, **2015**, 3, 22886-22891
$Ni_{2.3\%}$-CoS_2/CC	1.0 M KOH	0.97	100 mA/cm^2	231 mV	*Electrochem.Commun.*, doi:10.1016/j.elecom.2015.10.010
CoS_2 nanosheet P-doped CoS_2 nanosheet	0.5 M H_2SO_4 0.5 M H_2SO_4	2+0.1 2.5 ± 0.1	10 mA/cm^2 10 mA/cm^2	98 mV 67 mV	*Chem. Commun.,* **2015**, *51*, 14160-14163
CoPS film CoPS nanowires CoPS nanoplates	0.5 M H_2SO_4 0.5 M H_2SO_4 0.5 M H_2SO_4	N/A N/A N/A	10 mA/cm^2 10 mA/cm^2 10 mA/cm^2	128 mV 61 mV 48 mV	*Nature Mater.,* **2015**, *14*, 1245-1251
CoS_2/RGO-CNT	0.5 M H_2SO_4	1.15	10 mA/cm^2	142 mV	Angew. Chem. Int.Ed., **2014**, *53,* 12594 -12599
CoS_2 thin film	0.5 M H_2SO_4	N/A	10 mA/cm^2	192 mV	*J. Phys. Chem. C* **2014**, *118*, 21347-21356
CoS_2/Ti foil	0.5 M H_2SO_4	N/A	12.37 mA/cm^2	200 mV	Electrochimica Acta, **2014**, *148*,170-174
CoS_2 microwires CoS_2 nanowires	0.5 M H_2SO_4 0.5 M H_2SO_4	25 ± 2 1.7 ± 0.3	10 mA/cm^2 10 mA/cm^2	158 mV 145 mV	*J. Am. Chem. Soc.,* **2014**, *136,*10053-10061
CoS_2 film	0.5 M H_2SO_4	N/A	1 mA/cm^2	190 mV	*Energy Environ. Sci.*, **2013**, *6*, 3553-3558

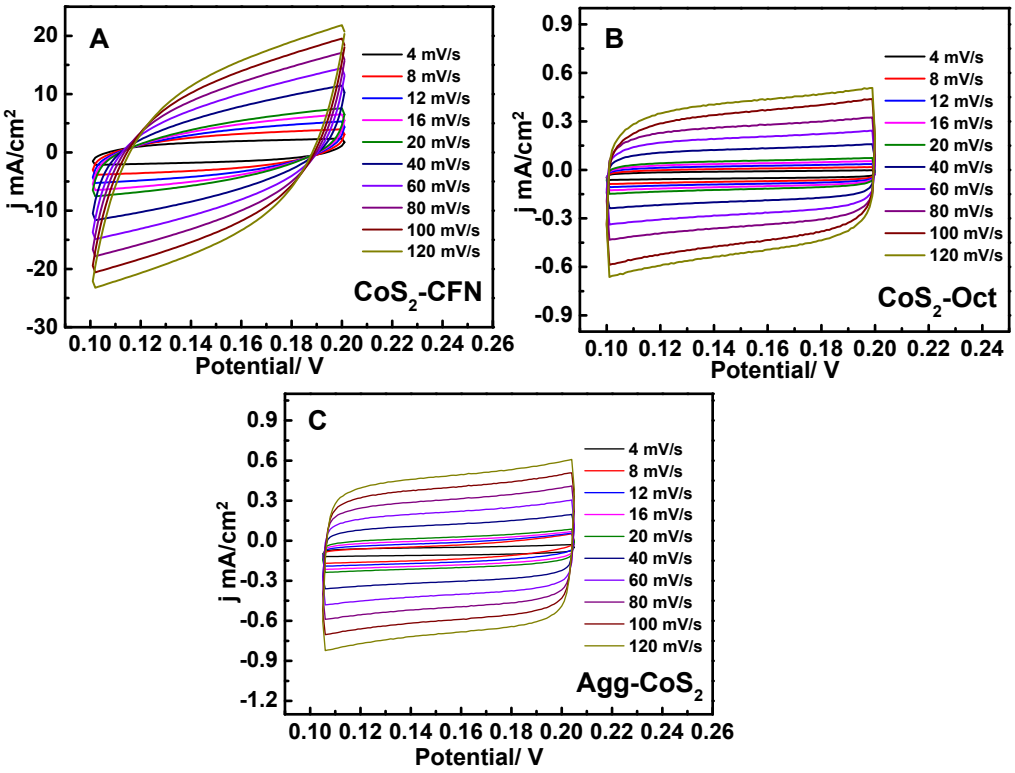

Figure S9. Cyclic voltammograms recorded with (A) CoS_2-CFN, (B) CoS_2-Oct and (C) Agg-CoS_2 in the potential region of 0.1-0.2 V vs. RHE at various scan rates for the purpose of determining the double layer capacitance.

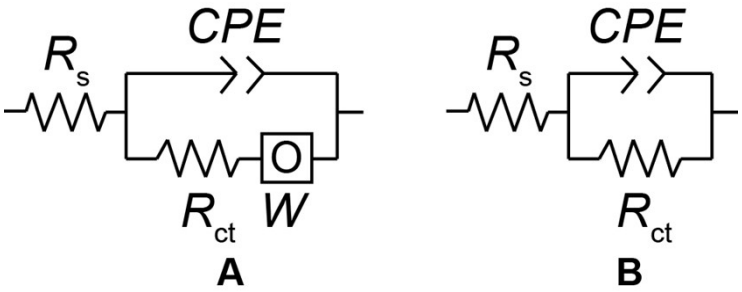

Figure S10. Corresponding equivalent circuit models of (A) CoS_2-CFN, (B) CoS_2-Oct and Agg-CoS_2. R_s is related to the series resistance, R_{ct} denotes the charge transfer resistance, CPE is the constant phase angle element, which represents the double layer capacitance of solid electrode in the real-world situation, and W is the Warburg impedance.