Supporting Information

Cracked eight-awn star TaS_2 with fractal structures performed as efficient electrocatalyst for hydrogen evolution reaction

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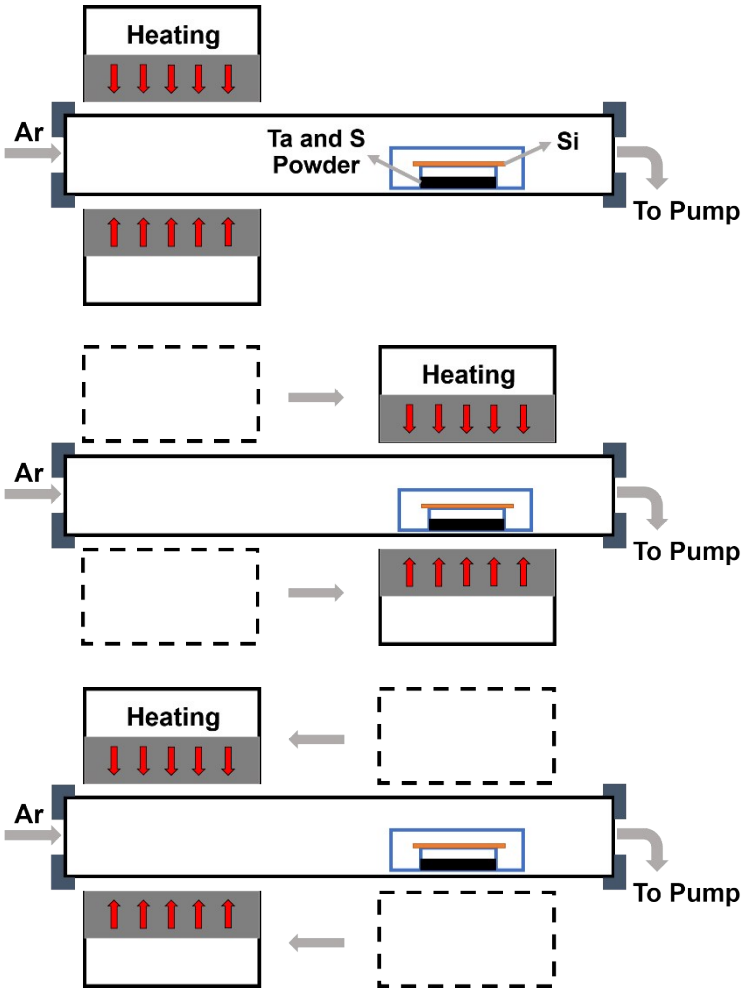

Fig. S1. Schematic view of growth setup (from top to bottom are stage one, two and three, respectively).

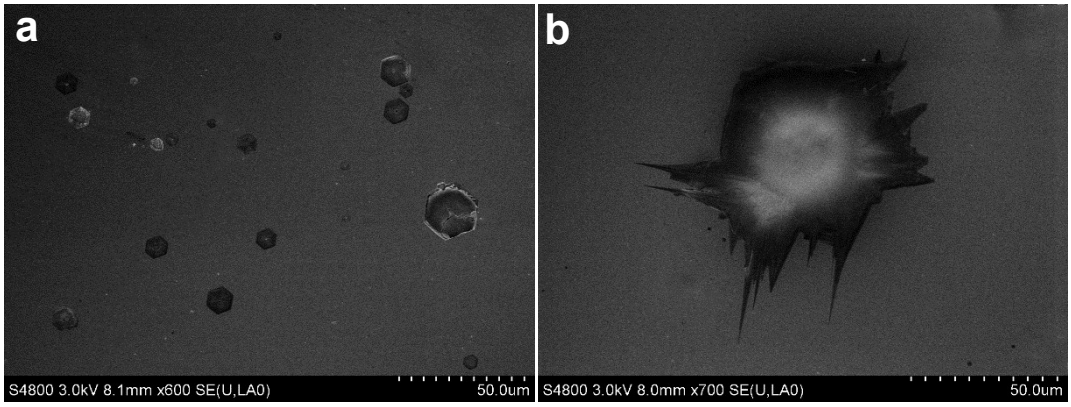

Fig. S2. SEM images of (a) hexagonal TaS_2 and (b) "sea urchin" TaS_2.

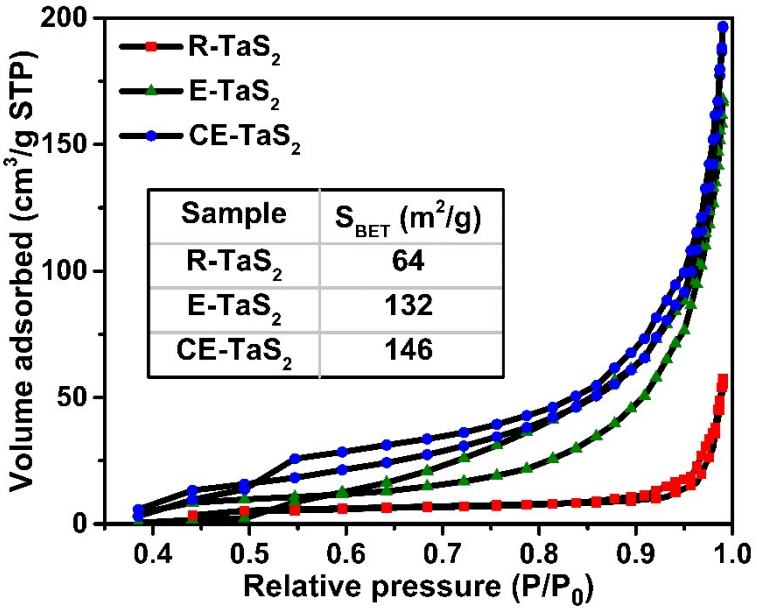

Fig. S3. N_2 adsorption–desorption isotherms of R-TaS_2, E-TaS_2, and CE-TaS_2.

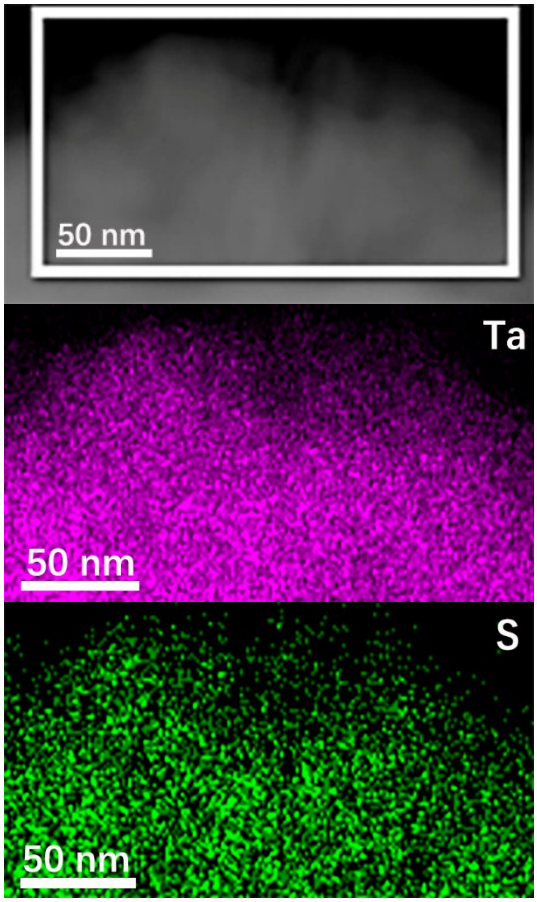

Fig. S4. Scanning transmission electron microscopy (STEM) image of CE-TaS_2, and the EDX mapping images of Ta and S elements.

Fig. S5. The digital photograph of the typical three-electrode system.

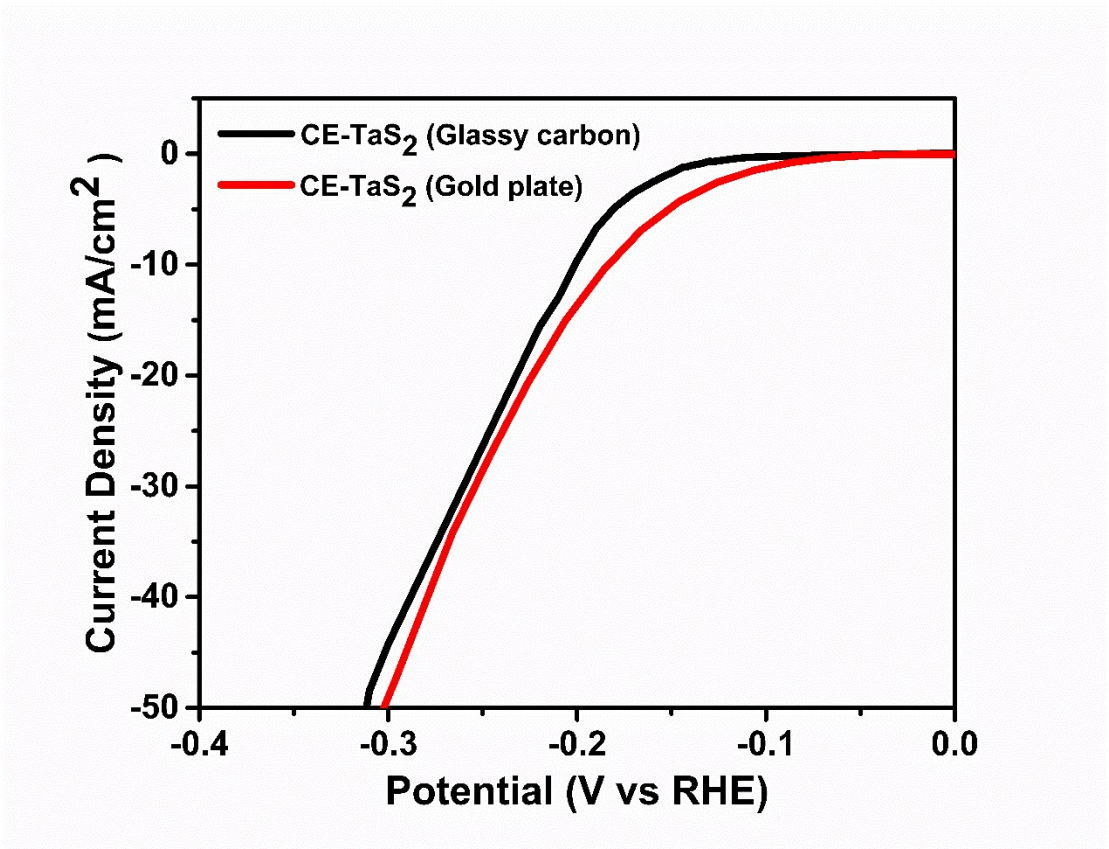

Fig. S6. Polarization curves of CE-TaS_2 on glassy carbon electrode and gold plate electrode, respectively.

Table 1. Comparison of HER activity data among various catalysts.

Catalyst	Loading density [mg cm^{-2}]	Onset potential [mV]	Overpotential / Current density [mV / (mA cm^{-2})]	Tafel slope [mV dec^{-1}]	Electrolyte	Reference
CE-TaS_2	0.285	102	192/10	66	0.5 M H_2SO_4	This work
E-TaS_2	0.285	126	282/10	74	0.5 M H_2SO_4	This work
R-TaS_2	0.285	174	302/10	108	0.5 M H_2SO_4	This work
3R TaS_2	0.285	106	196/10	85.1	0.5 M H_2SO_4	[S1]
2H TaS_2	0.285	381	545/10	158.9	0.5 M H_2SO_4	[S1]
1T TaS_2	0.285	361	475/10	104.4	0.5 M H_2SO_4	[S1]
Vertical 1T TaS_2	-	-	205-243/10	67-82	0.5 M H_2SO_4	[S2]
plasma-treated 1T TaS_2	0.24	200	564/10	135	0.5 M H_2SO_4	[S3]
1T TaS_2	0.24	310	722/10	215	0.5 M H_2SO_4	[S3]
1T TaS_2	-	-	770/10	~95	0.5 M H_2SO_4	[S4]
2H TaS_2	-	-	1220/10	~218	0.5 M H_2SO_4	[S4]
3R MoS_2	-	200	520/10	113	0.5 M H_2SO_4	[S5]
3R WS_2	-	230	560/10	111	0.5 M H_2SO_4	[S5]
2H MoS_2	0.566	80	280/25	90	0.5 M H_2SO_4	[S6]
2H WS_2	0.285	-	150/9.66	72	0.5 M H_2SO_4	[S7]

References

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