Rosette-like MoS_2 nanoflowers as highly active and stable electrodes for hydrogen evolution reactions and supercapacitors

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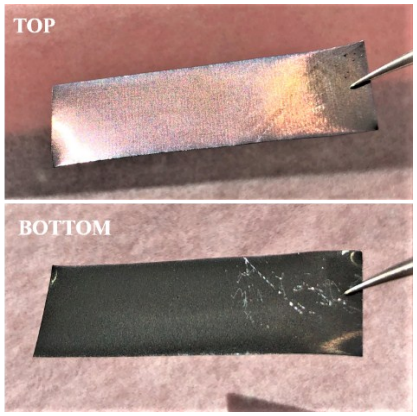

Fig. S1 Top and bottom surface of the MoS_2-grown titanium sheet after washing with ethanol and DI water

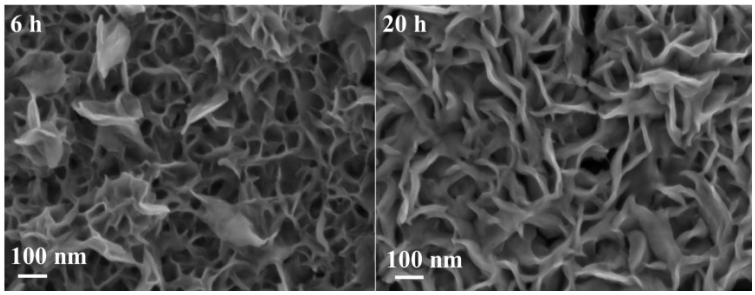

Fig. S2 SEM images of the samples with different synthesis time of 6 and 20 h

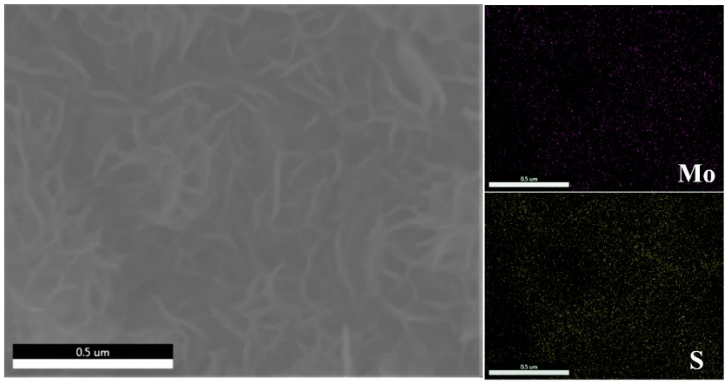

Fig. S3 Element mapping of the rosette-like MoS_2 nanoflowers

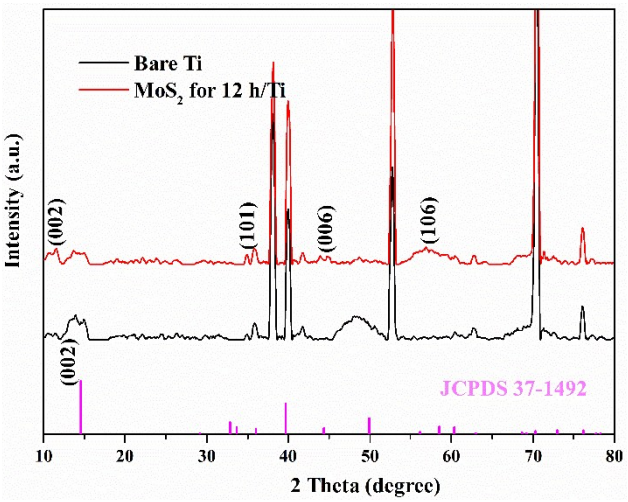

Fig. S4 XRD patterns of the rosette-like MoS_2 nanoflowers-grown Ti foil and bare Ti foil.

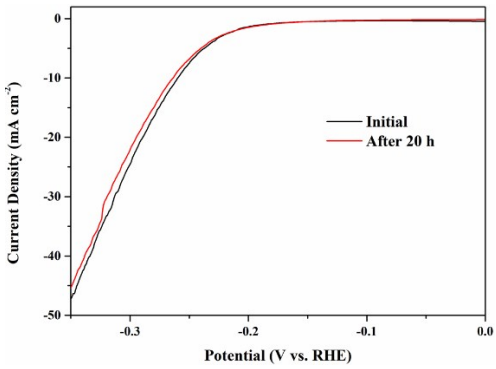

Fig. S5 LSV curves of the rosette-like MoS_2 nanoflowers before and after the durability tests

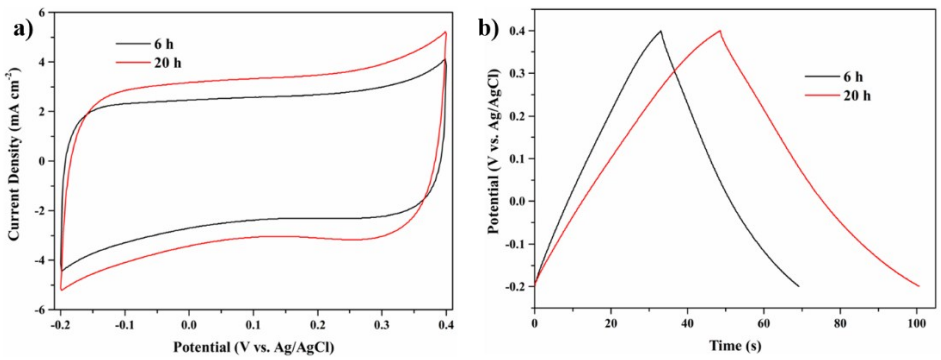

Fig. S6 Electrochemical energy storage performance of the as-prepared materials for 6 and 20 h. (a) CV curves at scan rates of 50 mV S^{-1}; (b) GCD curves at current density of 1 mA cm^{-2}

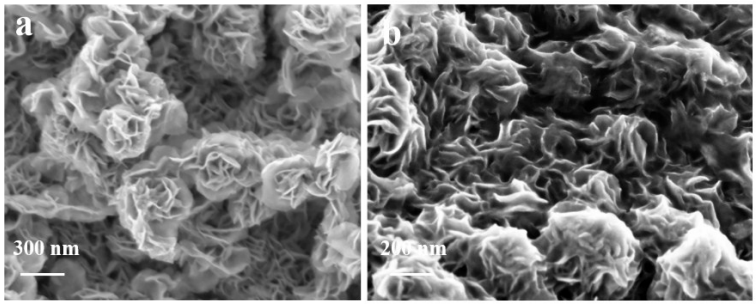

Fig. S7 SEM images of the rosette-like MoS_2 nanoflowers after (a) 3000 and (b) 4000 cyclability tests

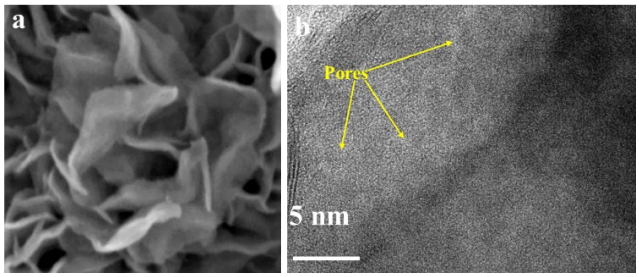

Fig. S8 (a) SEM and (b) HRTEM images of the rosette-like MoS_2 nanoflowers after the cyclability tests

Table S1. Comparison of the overpotential for the rosette-like MoS_2 nanoflowers with other recently reported MoS_2 nanocatalysts in acidic environment

Material	**Overpotential (V)**	**Current density (mA cm^{-2})**	**Ref.**
Rosette-like MoS_2	0.25	10	This work
MoS_2 Films	0.3	18.6	[1]
NPNi-MoS_2/RGO	0.205	10	[2]
MoS_2 Nanosheets	0.6	41	[3]
NiSA-MoS_2	0.11	10	[4]
Cu-doped MoS_2 nanofilms	0.3	2.6	[5]
MoS_2 film	0.19	20	[6]
MoS_2	0.178	10	[7]
Au-MoS_2	0.263	10	[8]
MoS_2 flower/Graphene	0.295	10	[9]
NF-MoS_2	0.214	10	[10]
1T/2H MoS_2	0.225	10	[11]

50 **Table S2.** Summary of Mo-based electrodes for supercapacitors in different electrolytes

Materials	Nanostructure	Capacitance	Current density	Electrolyte	Ref.
MoS_2	rosette-like	137 mF cm^{-2}	10 mA cm^{-2}	1M H_2SO_4	This Work
MoS_2@C	aerogels	712.6 F g^{-1}	1 A g^{-1}	6M KOH	[12]
MoS_2 Films	Porous films	14.5 mF cm^{-2}	1 mA cm^{-2}	1M LiOH	[1]
MoS_2	Nanoflowers	259 F g^{-1}	5 mV S^{-1}	1 M KCl	[13]
MoS_2-rGO	Nanoflowers	387.6 F g^{-1}	1.2 A g^{-1}	1M Na_2SO_4	[14]
MoS_2/C	Yolk-shell	418 F g^{-1}	0.5 A g^{-1}	0.5M Na_2SO_4	[15]
MoS2	Flower-like	518.7 F g^{-1}	1 A g^{-1}	1M Na_2SO_4	[16]

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Supporting References

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