Supplementary Information

Ruthenium doping in MoS_2/AB heterostructure for hydrogen evolution reaction in acid media

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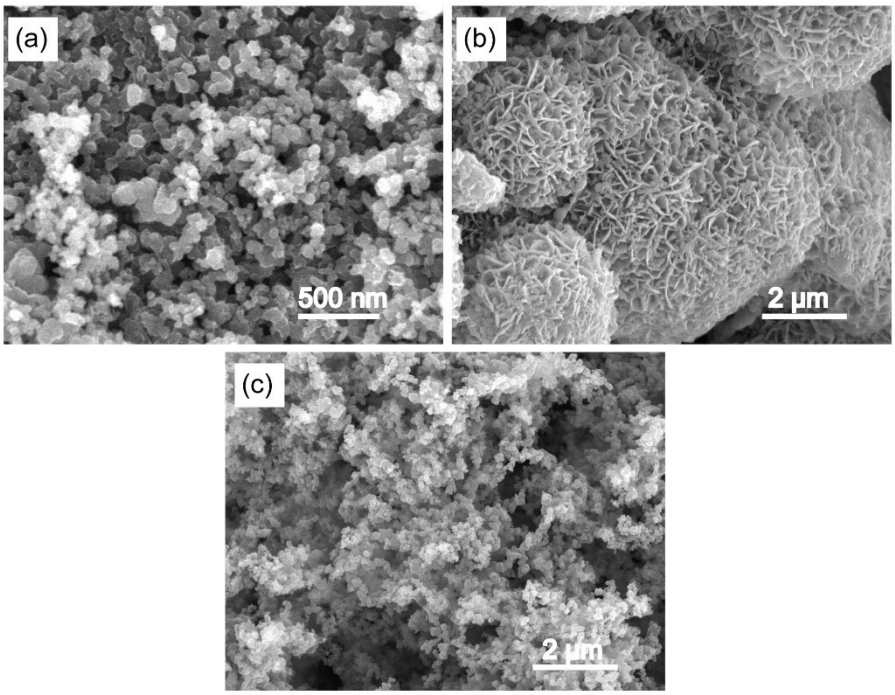


Fig.S1 SEM of (a) AB, (b) Ru-MoS_2, (c) Ru-AB.

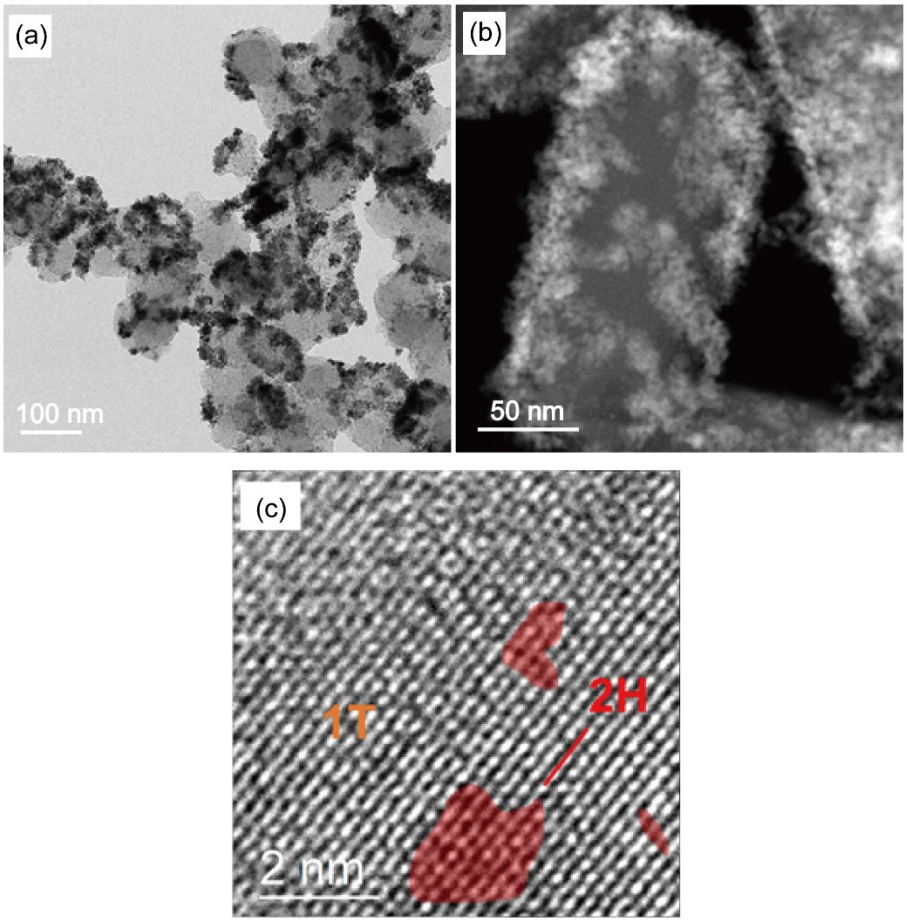


Fig.S2 (a) TEM, (b) HAADF and (c) HRTEM images of Ru-MoS_2/AB.

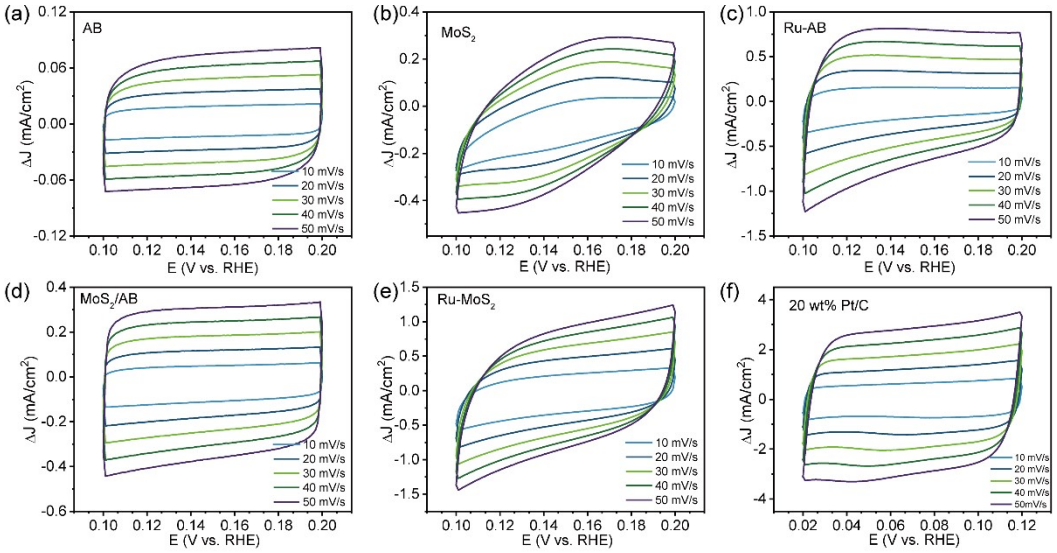


Fig.S3 CV curves at different various scan rates of (a) AB, (b) MoS_2, (c) Ru-AB, (d) MoS_2/AB, (e) Ru-MoS_2 and (f) Pt/C (20%) in 0.5 M H_2SO_4 solution at the potential range of 0.1~0.2 V (vs. RHE).

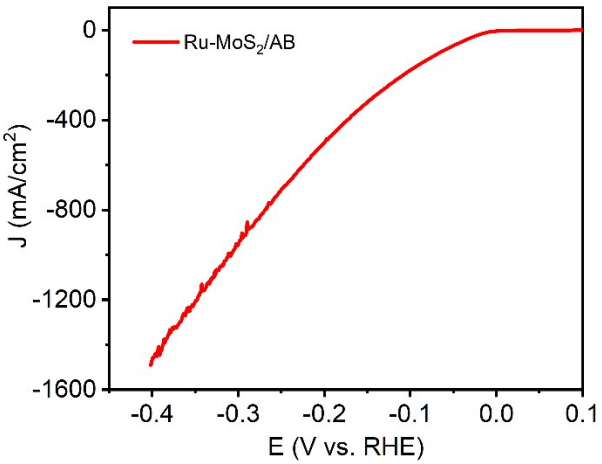
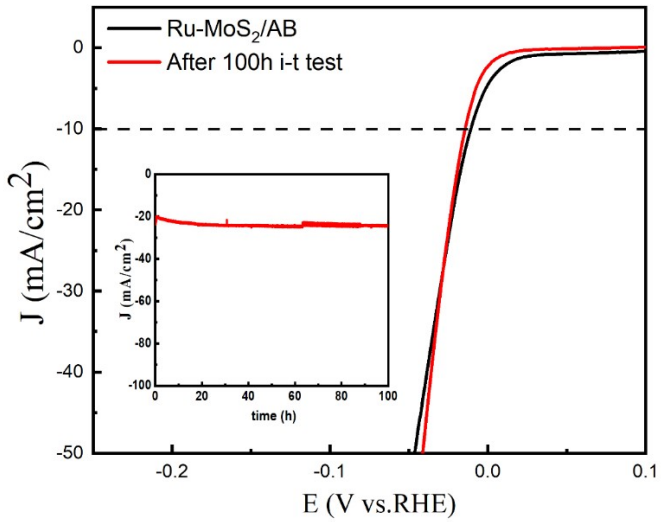


Fig. S4 LSV curve of Ru-MoS_2/AB in 0.5 M H_2SO_4.



FigS5 Durability tests of Ru-MoS_2/AB for 100 h.

Table S1 Comparison of MoS_2-based and Ru-based electrocatalysts for HER

Sample	Electrolyte	η_{10}(mV)	Tafel (mV·dec^{-1})	Ref.	Year
MoS_2/ACET-Ru	0.5 M H_2SO_4	12.6	31	This work	
B-Ru@CNT	0.5 M H_2SO_4	-62	82	[1]	2022
E-MoS_2-Pt-r	0.5 M H_2SO_4	-38	29	[2]	2022
Ru@Co/N-CNTs-2	0.5 M H_2SO_4	-92	45	[3]	2020
Co–Ru–MoS_2	1 M KOH	-52	55	[4]	2020
Ru/C-H_2O/CH_3CH_2OH	0.5 M H_2SO_4	-35	36.2	[5]	2019
Ru1-GC	1 M H_2SO_4	-20	29	[6]	2018
Ru/MoS_2	0.5 M H_2SO_4	-96	-	[7]	2017
Rh-MoS_2	0.5 M H_2SO_4	-47	24	[8]	2017
Ru-MoS_2/CL	0.5 M H_2SO_4	-50	46	[9]	2020
MoS_2/Mo	0.5 M H2SO4	-242	44.7	[10]	2016
N,Pt-MoS_2	1 M KOH	-38	39	[11]	2022
Ru@C_2N	0.5 M H_2SO_4	-13.5	30	[12]	2017
Ru SASs+NPs/NG	1 M KOH	-12	36.6	[13]	2022
Co1Ru@Ru/CNx	1 M KOH	-30	42	[14]	2022
Ru/C-TiO_2	1 M KOH	-44	73.7	[15]	2020
Ru-NMCNs-500	1 M KOH	-28	35.2	[16]	2020
NRAS	1 M KOH	-72	193	[17]	2020
Ru-Mo_2C/CN	1 M KOH	-34	80	[18]	2020
SA-Ru-MoS_2	1 M KOH	-76	21	[19]	2019
Ru-MoS_2/CC	1 M KOH	-171(η_{100})	114	[20]	2019
Pd_3Ru	1 M KOH	-104	-	[21]	2019
Cu@MoS_2	1 M KOH	-131	51	[22]	2019

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