Electronic Supplementary Information

MoO_2 Nanobelts@Nitrogen Self-doped MoS_2 Nanosheets as Electrocatalyst for the Enhanced Hydrogen Evolution Reaction

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Table S1 Comparison of the HER performance among different literatures

Samples	Onset overpotential (mV)	Tafel Slope (mV/decade)	literatures
① MoS_2/reduced graphene	–100	41	8b
② MoS_2		94	
① defect-rich MoS_2	–120	50	21
② defect-free MoS_2	–180	90	
① MoO_2@N-doped MoS_2	–156	47.5	Our experiment
② MoS_2	–261	77.5	

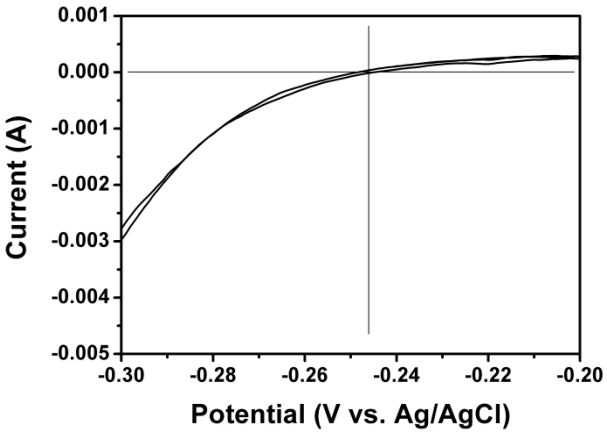

Figure S1. Reversible hydrogen electrode (RHE) was tested in our experiment.

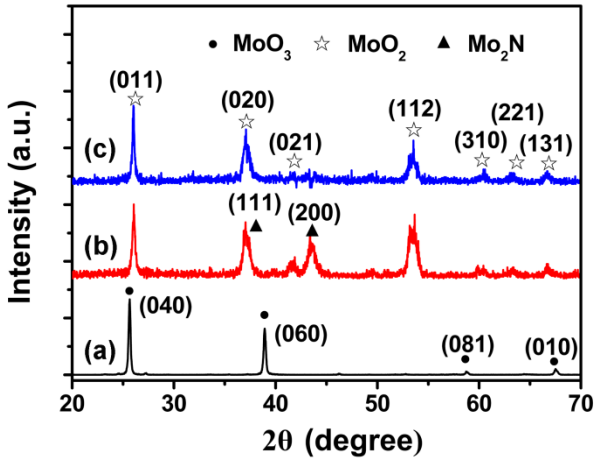

Figure S2. XRD result of different samples obtained different process: (a) MoO_3 nanobelts, (b) MoO_2@Mo_2N nanobelts and (c) MoO_2 nanobelts@nitrogen-doped MoS_2 nanosheets.

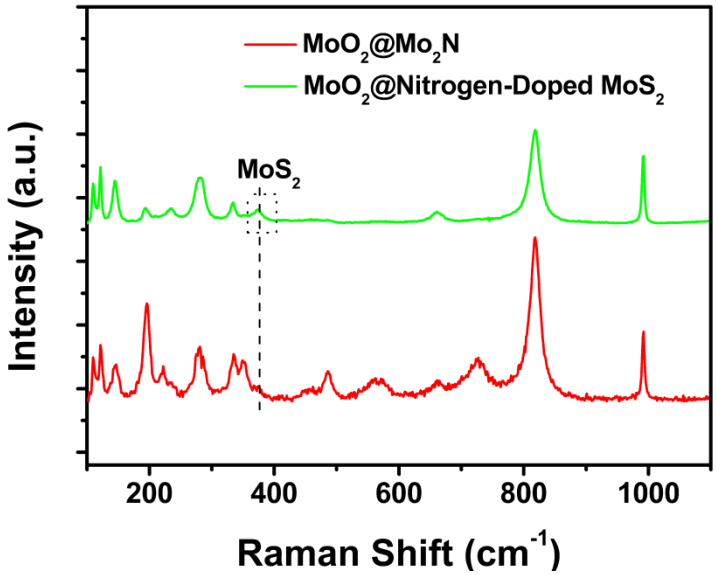

Figure S3. Raman spectra of MoO_2@Mo_2N nanobelts and MoO_2 nanobelts@nitrogen-doped MoS_2 nanosheets.

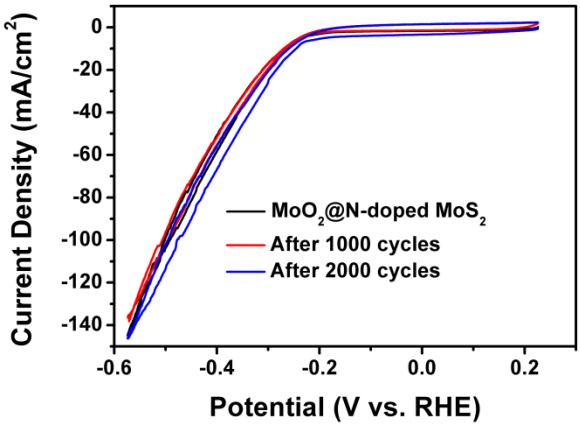

Figure S4. Reverse scans of MoO_2@N-doped MoS_2 electrode.

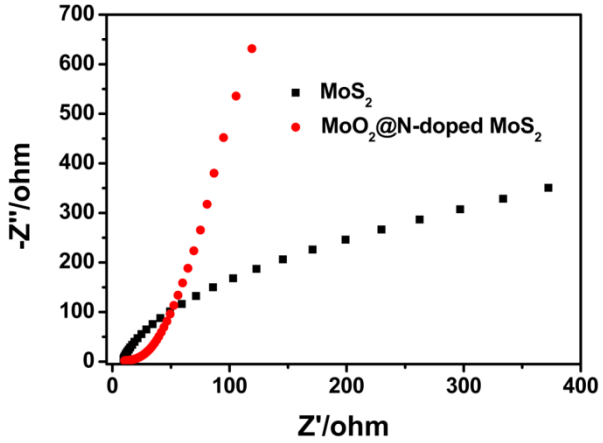

Figure S5. Nyquist plots of MoS_2 and MoO_2@N-doped MoS_2. It can be seen that the MoS_2 sample showed an arc with a large diameter suggesting a large charge–transfer resistance for HER, whereas the MoO_2@ MoS_2 sample showed almost no arc but a linear profile which suggests significantly reduced charge-transfer resistance and hence the HER was under diffusion control. This indicates that the electronic conductivity of MoO_2@ MoS_2 is indeed markedly enhanced as compared to MoS_2 alone.

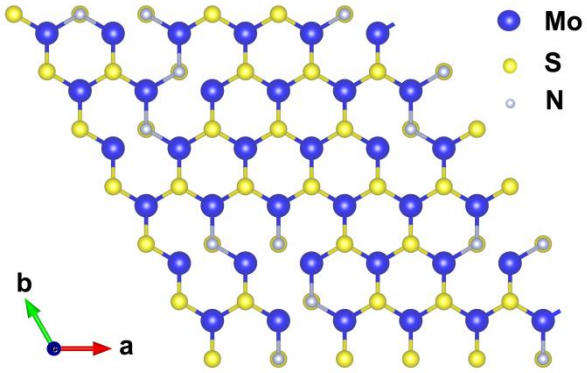

Figure S6. Schematic representation of N-doped MoS_2 nanosheets. Blue for Mo atoms, yellow for S atoms, and gray for N atoms.

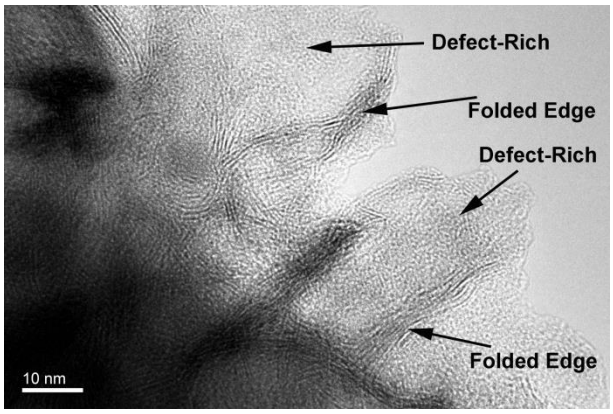

Figure S7. HRTEM image N-doping MoS_2 nanosheets.

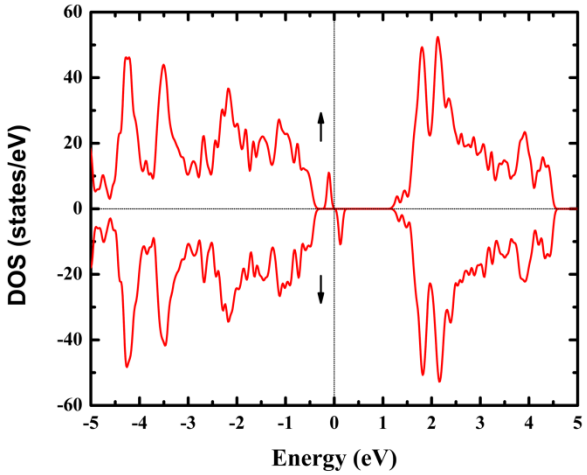

Figure S8. DOS of N-doped MoS_2 monolayer. The positive and negative values indicate the spin up and down DOS respectively. The Fermi energy is set to 0.