Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supplementary Information

Integrating Trace Amounts of Pd Nanoparticles into Mo_3N_2 Nanobelts for Improved Hydrogen Evolution Reaction

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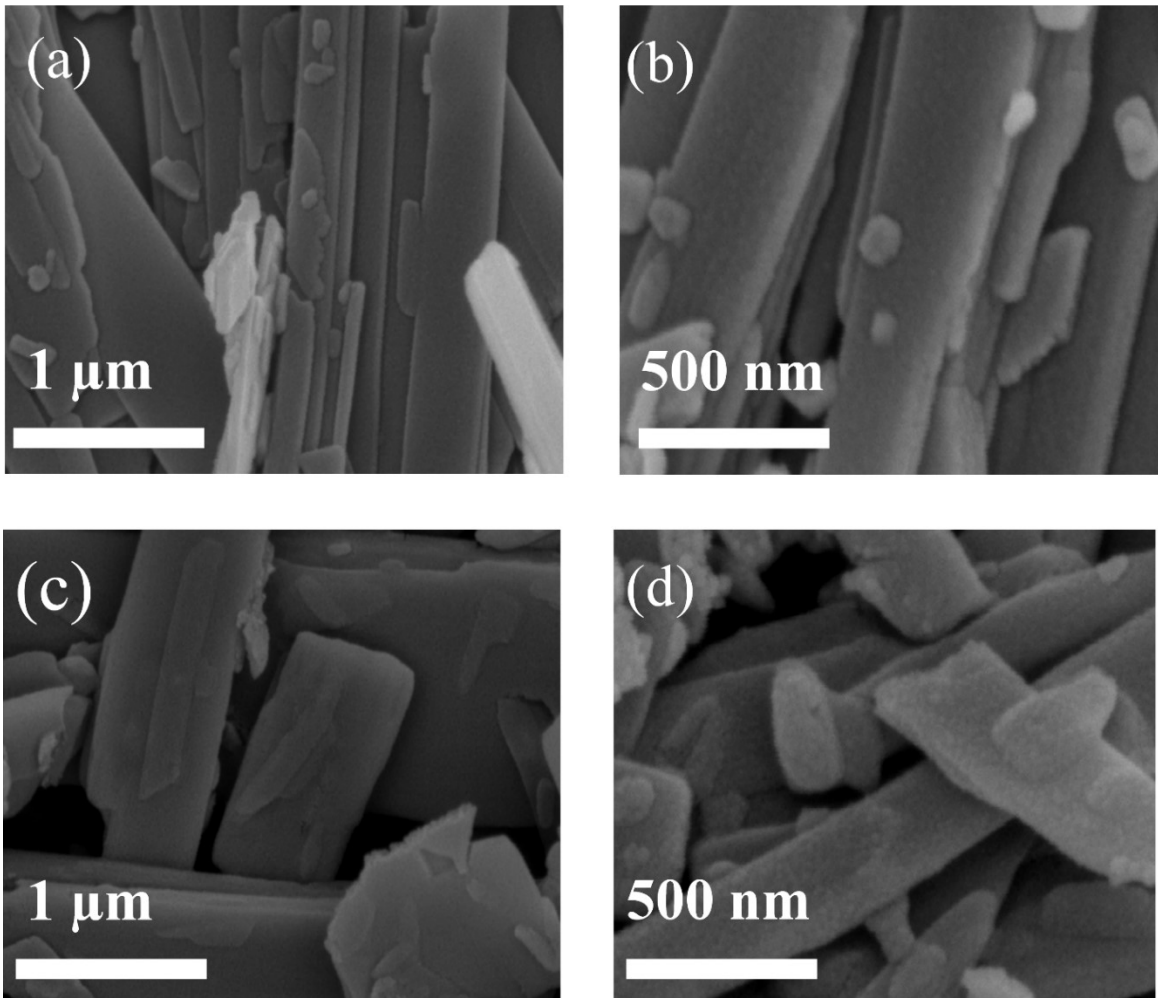

Figure S1. (a, b) Low resolution SEM images of Mo_3N_2 nanobelts. (c, d) Low resolution SEM images of 1.5 wt%Pd/Mo_3N_2 nanobelts.

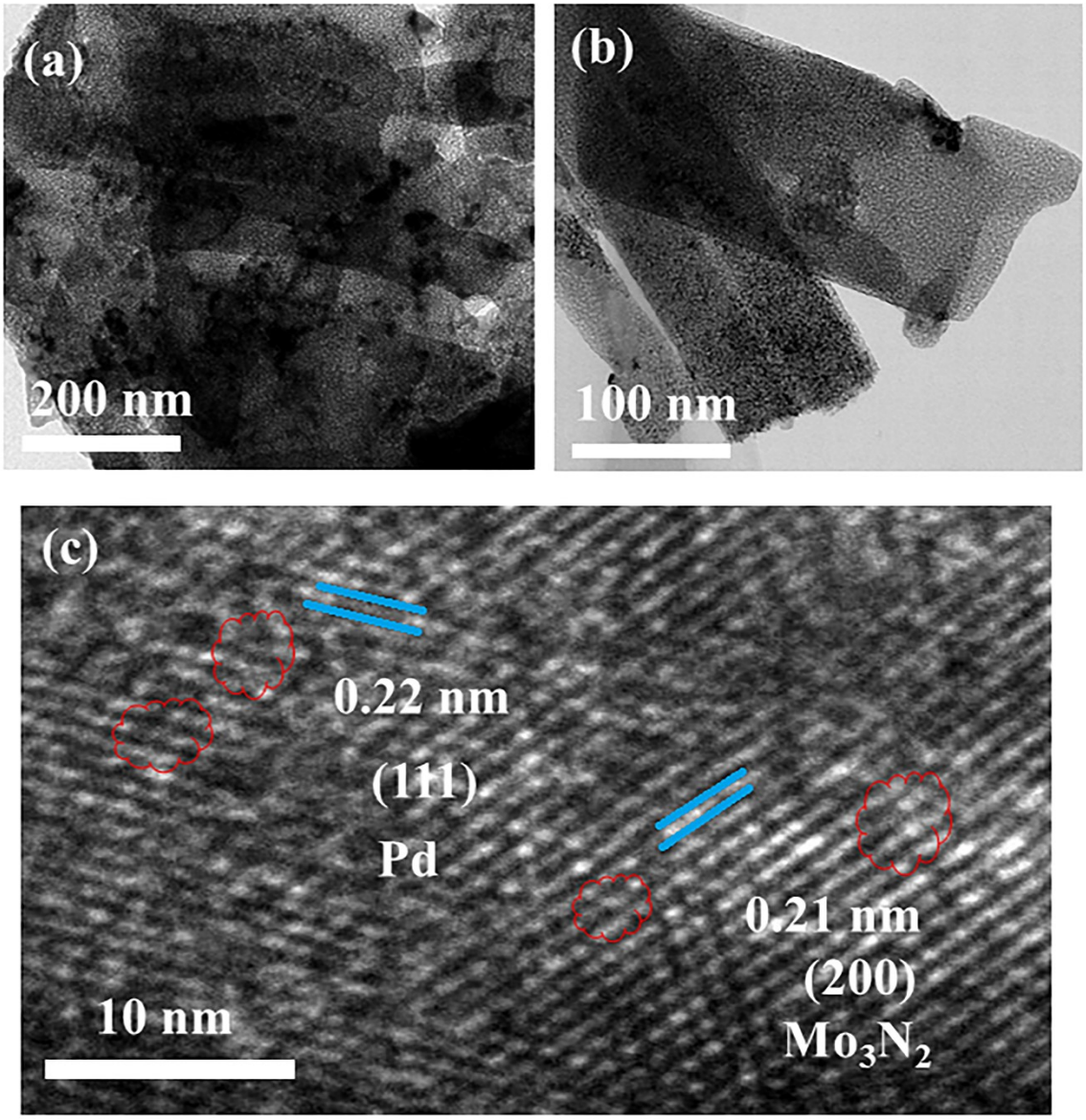

Figure S2. (a, b) TEM images of Mo_3N_2 and 0.75 wt%Pd/$Mo3_3N_2$ nanobelts. (c) HRTEM image of 0.75 wt%Pd/Mo_3N_2.

Table S1. Contents of Pd in catalysts from elemental analyzer

Element	Weight%	Atomic%
N K	5.74	29.58
Mo K	93.16	69.79
Pd L	1.09	0.73
Total	99.99	

Table S2. Contents of Pd in catalysts from ICP-OES analysis

Sample	Pd (weight %)
0.5Pd/Mo_3N_2	0.41
0.75Pd/Mo_3N_2	0.68
1.5Pd/Mo_3N_2	1.2

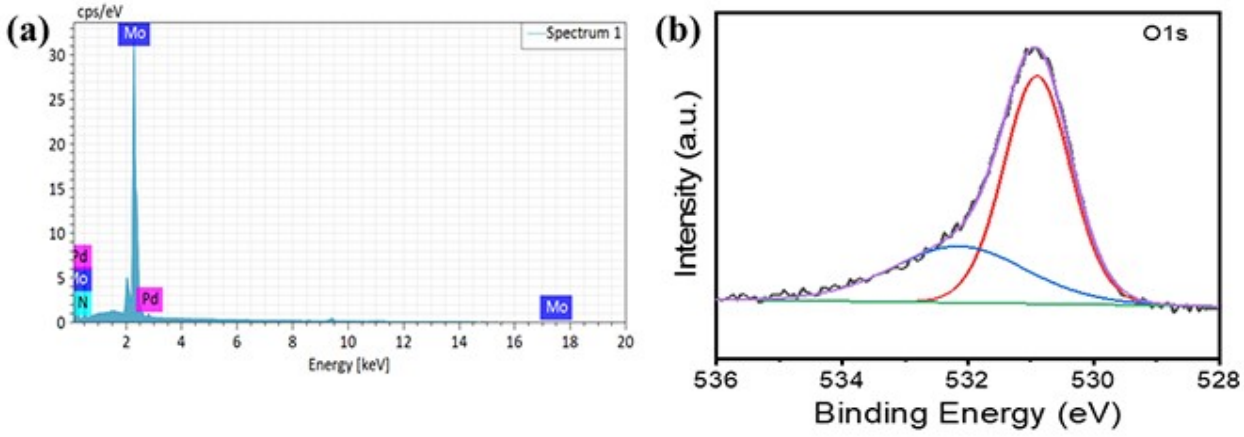

Figure S3. (a) EDX spectra of 0.75 wt%Pd/Mo_3N_2. (b) High resolution XPS spectra of O 1s.

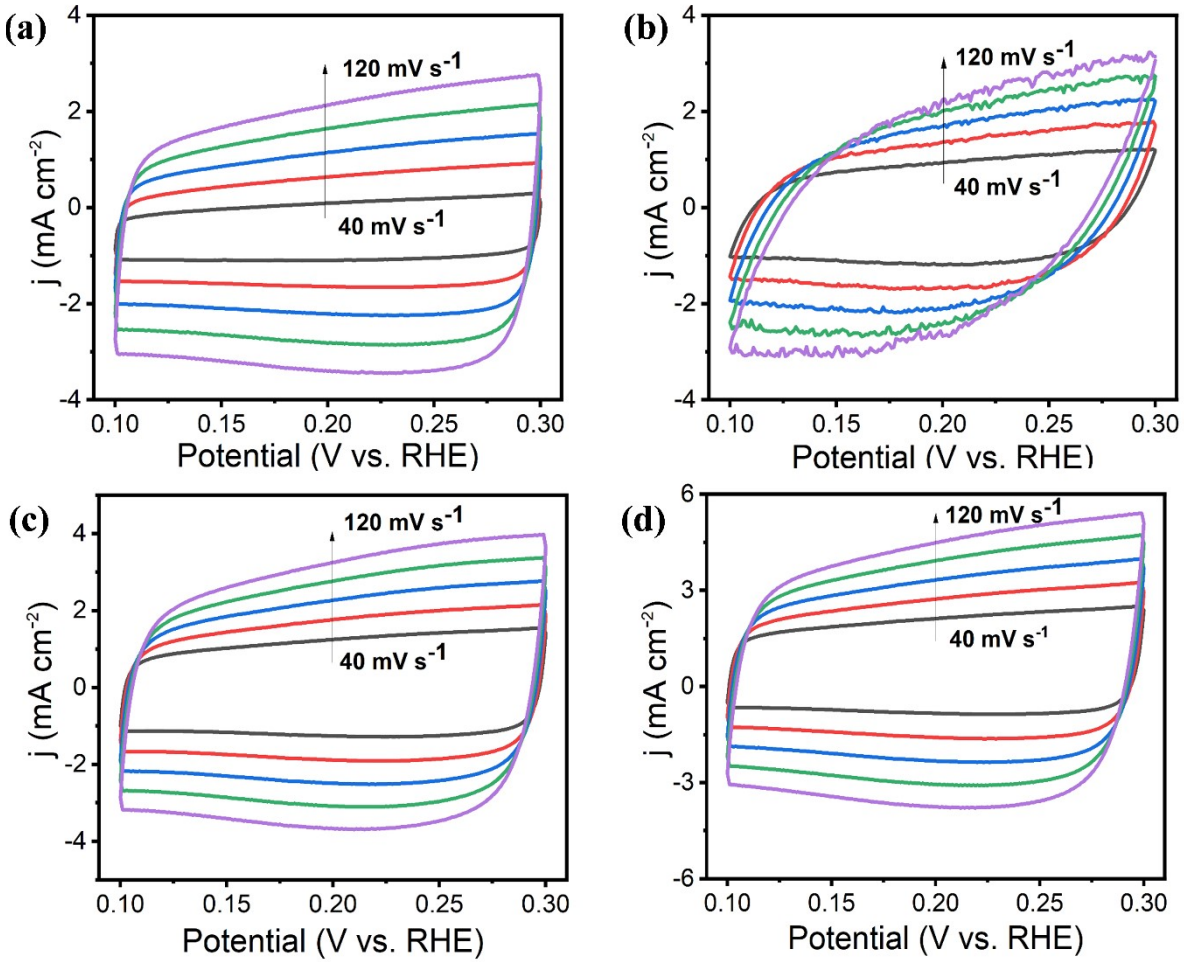

Figure S4. Cyclic voltammograms with a scan rate of 40, 60, 80, 100 and 120 mV s^{-1} in 1 M KOH for Mo_3N_2 (a), 0.5 wt%Pd/Mo_3N_2 (b), 0.75 wt%Pd/Mo_3N_2 (c), and 1.5 wt%Pd/Mo_3N_2 (d).

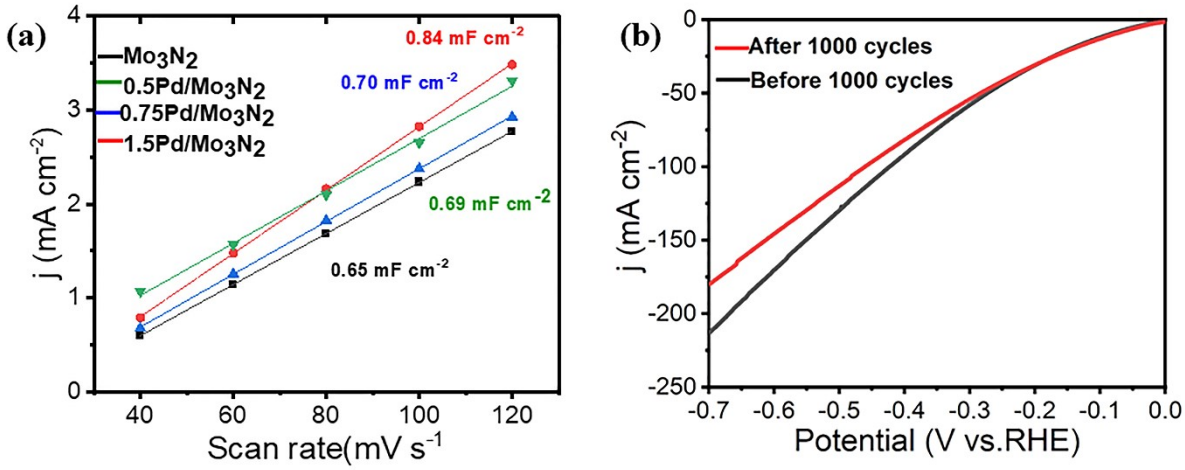

Figure S5. (a) Capacitive current as a function scan rate for Mo_3N_2, 0.5 wt%Pd/Mo_3N_2, 0.75 wt%Pd/Mo_3N_2, and 1.5 wt%Pd/Mo_3N_2 electrocatalysts. (b) LSV curves before and after durability test.

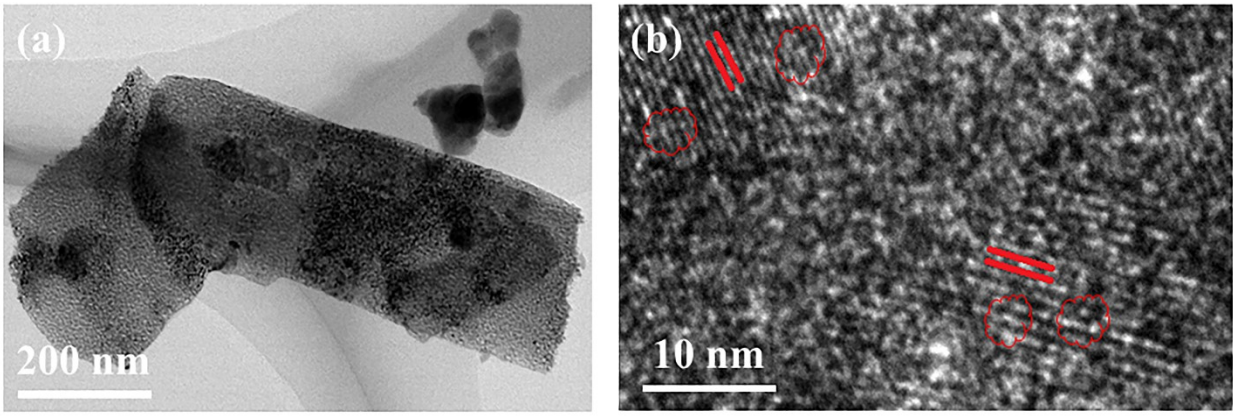

Figure S6. TEM and HRTEM images of 0.75 wt%Pd/Mo_3N_2 after the stability test.

Table S3. Comparison of HER performance of 0.75Pd/Mo_3N_2 with other Pd-based electrocatalysts in electrolyte.

Catalysts	**Pd (mg)**	**Electrolyte**	**Mass loading (mg cm^{-2})**	**Overpotential at 10 mA cm^{-2} (mV)**	**Tafel slope (mV dec^{-1})**	**Ref.**
PdCuRu 7.6	0.1 M	KOH	0.2	31	52	1
Pd/G/ZnO/NF	0.29	1 M KOH	-	31	46.5	2
Pd-Pt	17.4	1 M KOH	0.02	71	31	3
Pd-g-C_3N_4	14.9	0.5 H_2SO_4	0.04	55	35	4
Mn_3N_2/PdO	18	0.5 M H_2SO_4	0.24	44.6	49.6	5
Pd@CoFe /NCNT	13.85	1 M KOH	0.27	214	120	6
PdSn	63.6	1 M H_2SO_4	2.75	68	204	7
C-PdPt	4.06	0.5 M H_2SO_4	0.26	26	33	8
0.75Pd/Mo_3N_2	7.9	0.5 M H_2SO_4	0.2	41	88	This work
0.75Pd/Mo_3N_2	7.9	1 M KOH	0.2	65	70	This work

Reference

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