

Supporting Information

Ultra-small nickel phosphide nanoparticles as an high-performance electrocatalysis for hydrogen evolution reaction

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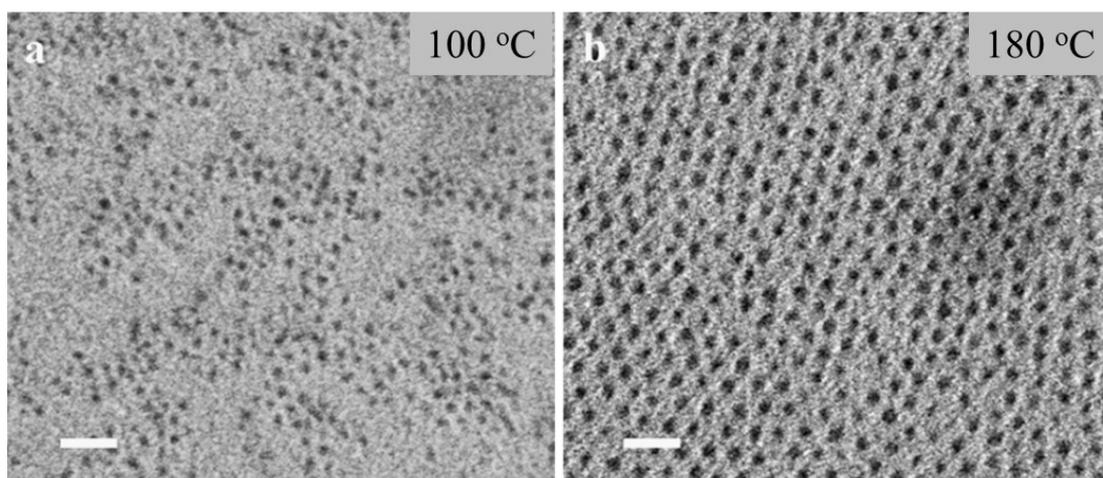


Figure S1. Low-magnification TEM images of Ni_2P with different sizes synthesized at different temperatures without OAm: 100 °C (a) and 180 °C (b) The scale bar is 20 nm.

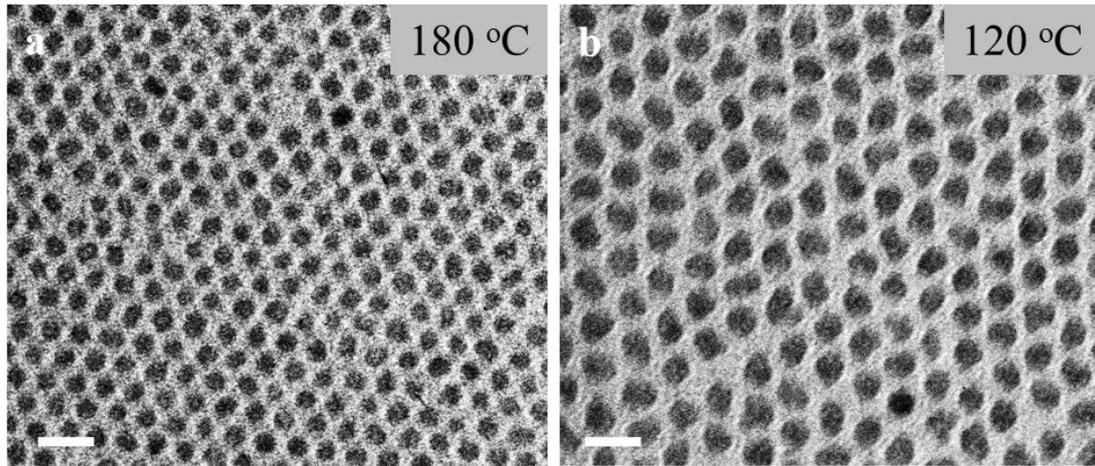


Figure S2. Low-magnification TEM images of Ni_2P with different sizes synthesized at different temperatures with 0.5 mL of OAm: (a) 8.1 nm and (b) 11.8 nm. The scale bar is 20 nm.

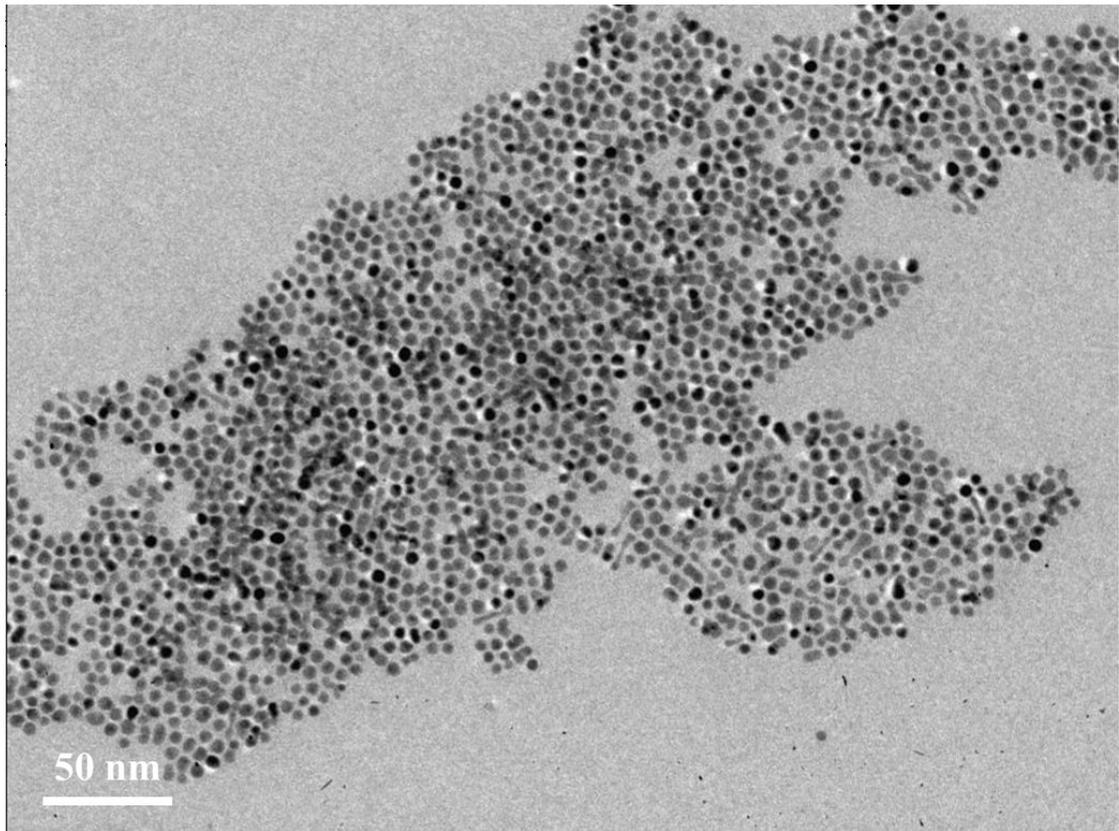


Figure S3. Wide area TEM image of 2.8 nm Ni_2P nanoparticles after high temperature annealing.

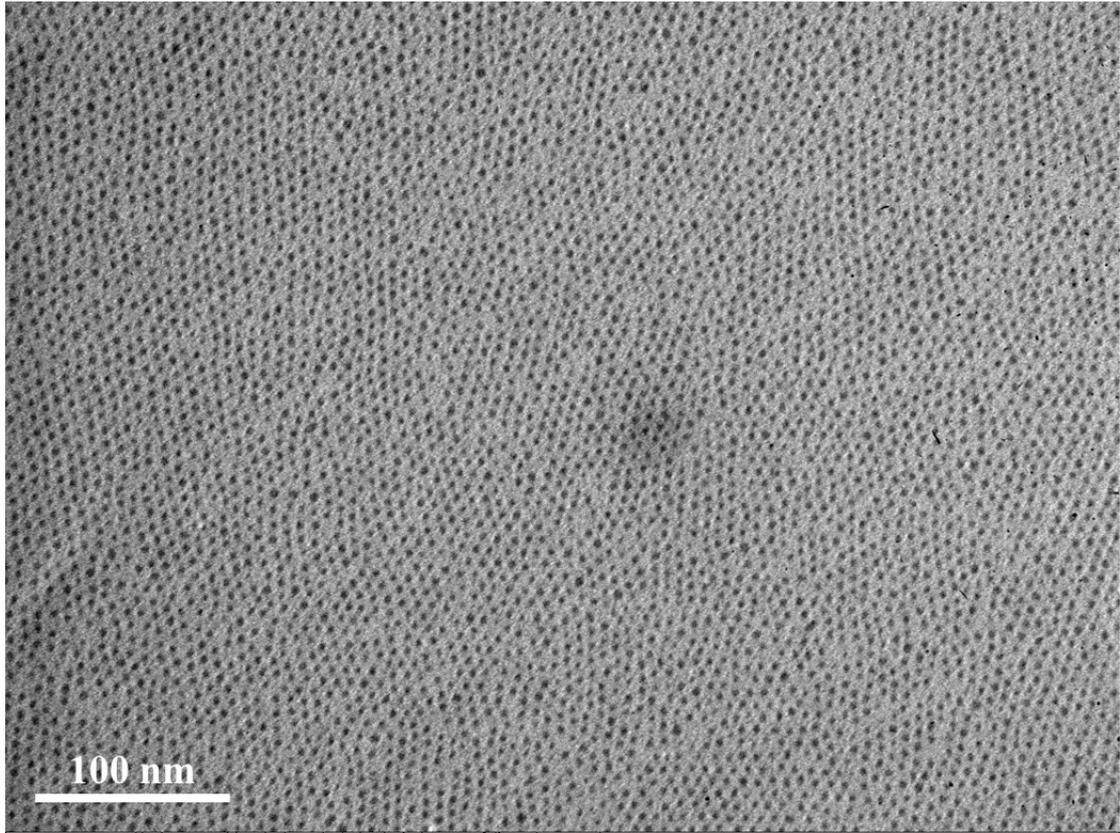


Figure S4. Wide area TEM image of 2.8 nm amorphous Ni_2P nanoparticles.

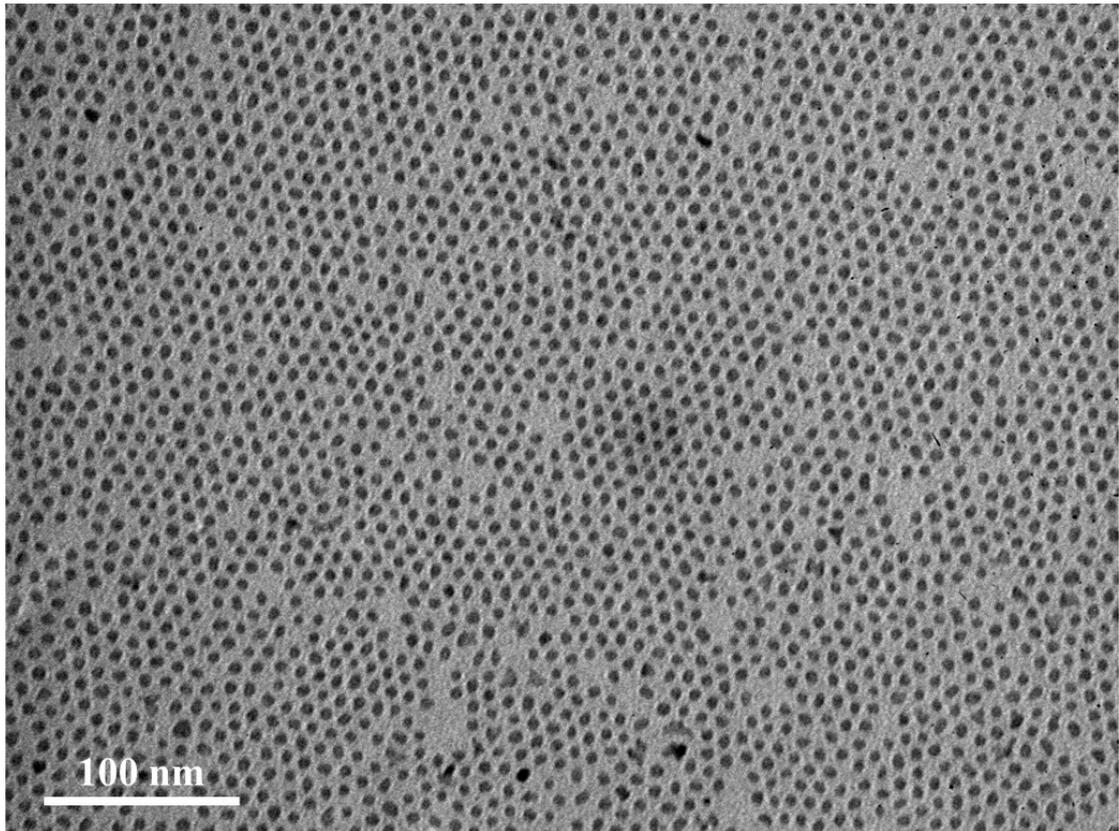


Figure S5. Wide area TEM image of 5.4 nm amorphous Ni_2P nanoparticles.

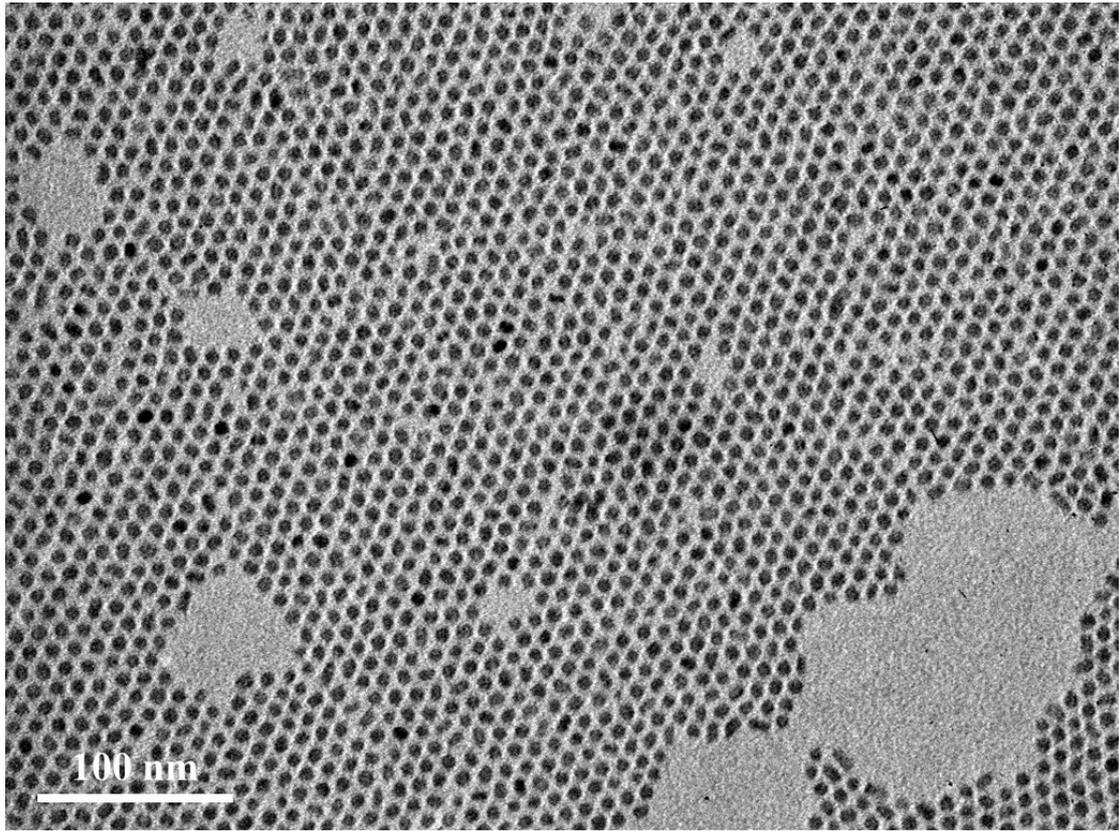


Figure S6. Wide area TEM image of 8.1 nm amorphous Ni_2P nanoparticles.

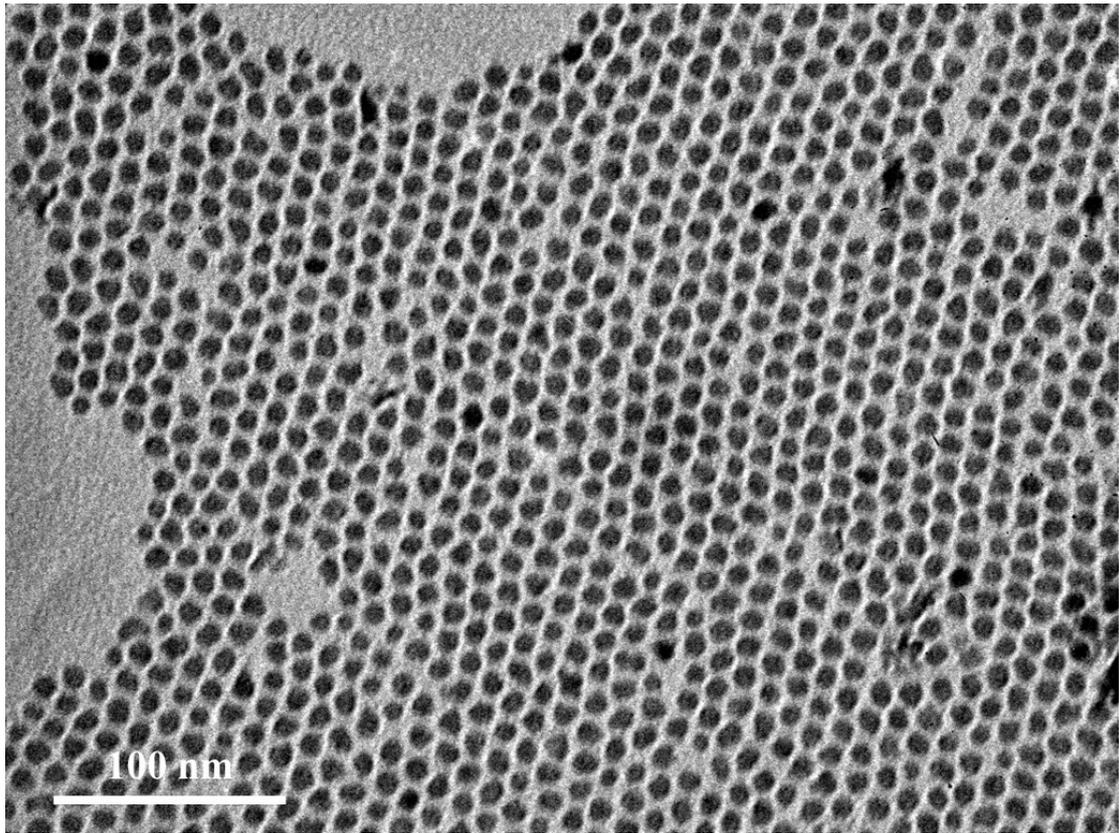


Figure S7. Wide area TEM image of 9.5 nm amorphous Ni_2P nanoparticles.

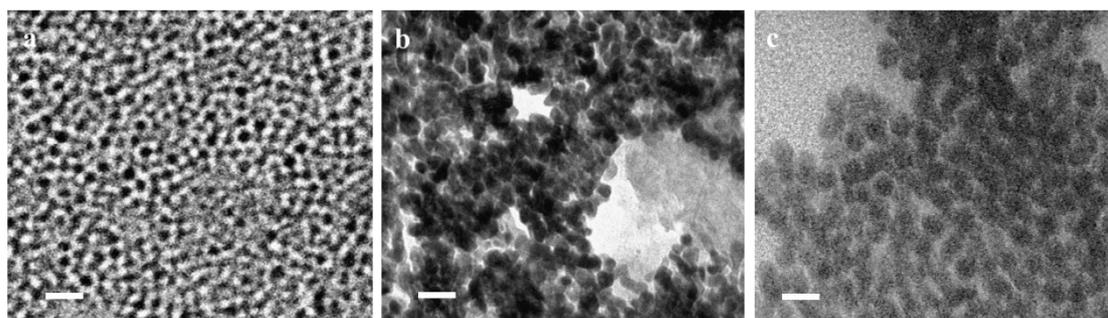


Figure S8. Low-magnification TEM images of Ni_2P with different sizes annealing at 450 °C for 2 hours: (a) 5.4 nm; (b) 8.1 nm; and (c) 9.5 nm. The scale bar is 20 nm.

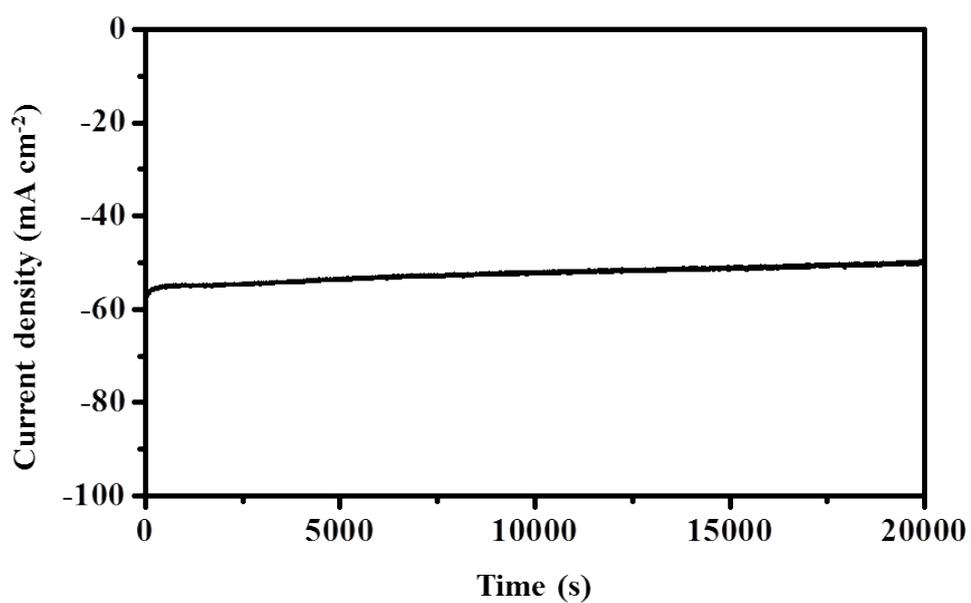


Figure S9. Chronoamperometric stability measurements of 8.1 nm Ni₂P NPs (1.0 mg•cm⁻²) held at -150 mV vs. RHE for 5.6 hours in 0.5 M H₂SO₄.

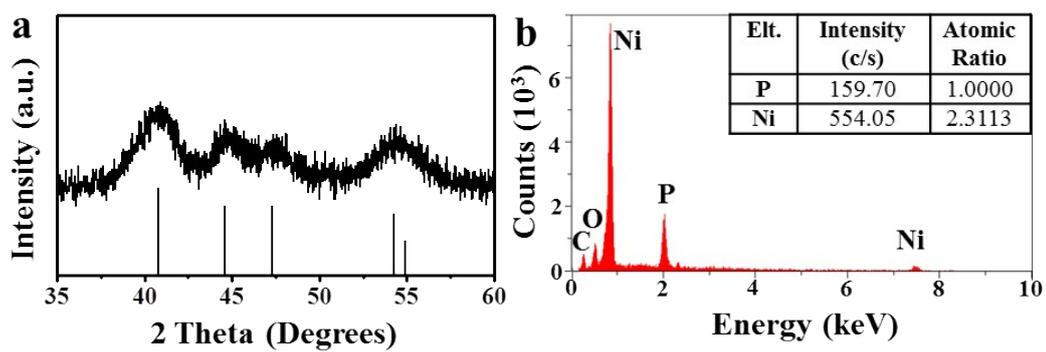


Figure S10. (a) XRD patterns and (b) EDS spectrum of 8.1 nm Ni_2P NPs after long-term stability test.

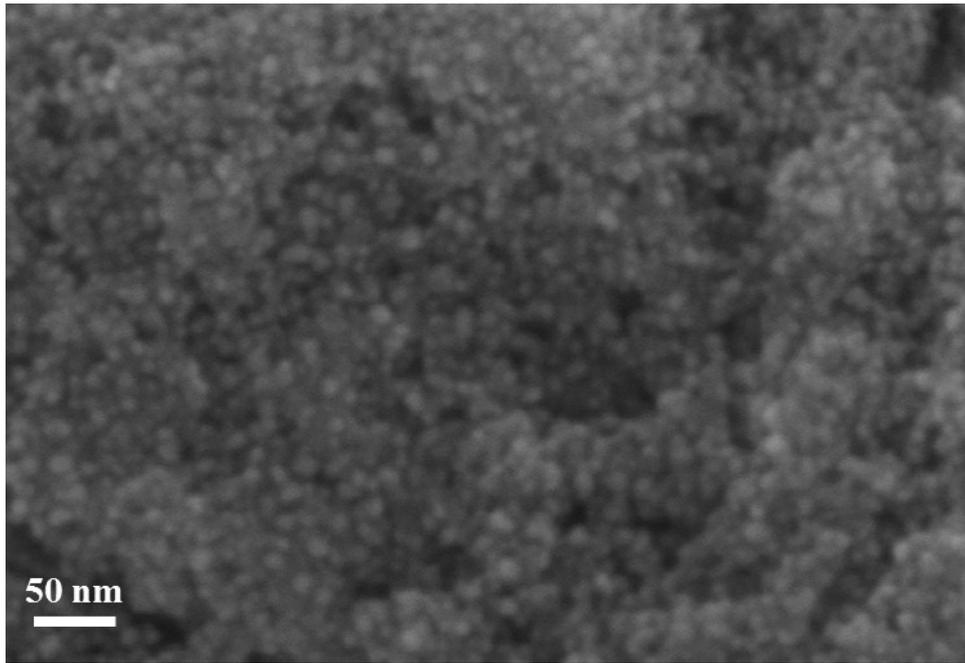


Figure S11. SEM image of 8.1 nm Ni₂P NPs after long-term stability test.

Table S1. Comparison of TOFs of Ni₂P NPs with different sizes from this report.

Size (nm)	5.4 nm	8.1 nm	9.5 nm
Tafel slop (mV/decade)	41.4	44.9	46.7
Sg (cm ² /mg)	1511	1020	960
Current Density at 150 mV (mA/cm ²)	123.1	55.2	34.0
TOFs (s ⁻¹ atom ⁻¹)	0.10	0.07	0.04