

Supporting Information

CoP nanoparticles deposited on reduced graphene oxide sheets as an active electrocatalyst for hydrogen evolution reaction

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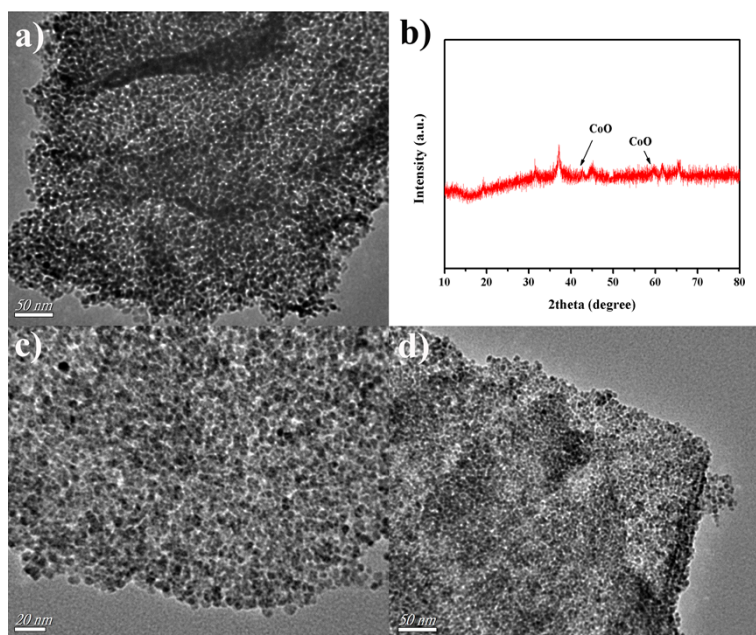


Fig. S1. (a) TEM image of the product synthesized with only water as the reaction solvent. (b) XRD pattern of the product synthesized with only absolute ethanol as the reaction solvent. (c) and (d) show the TEM images of the products obtained with 1.5 and 2.5 mL of water in the mixed solvent, respectively.

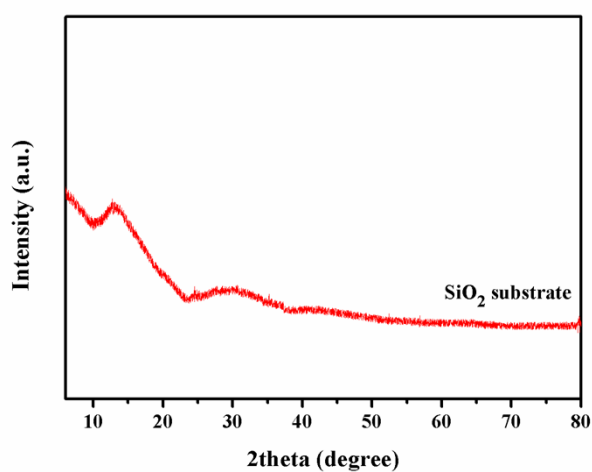


Fig. S2. XRD pattern of the SiO_2 substrate in XRD measurements.

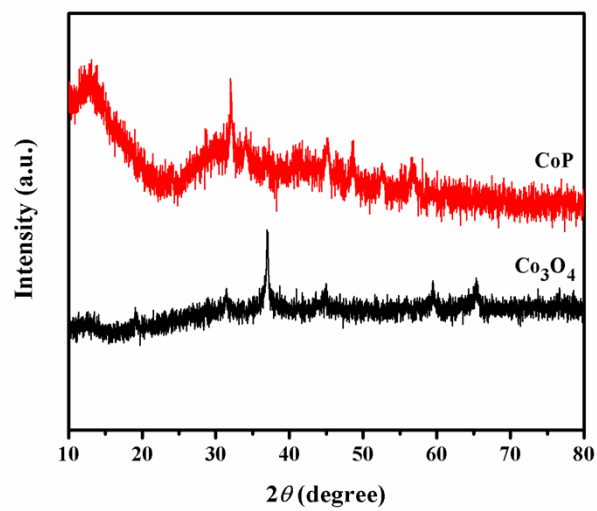


Fig. S3. XRD patterns of pure Co_3O_4 and CoP particles.

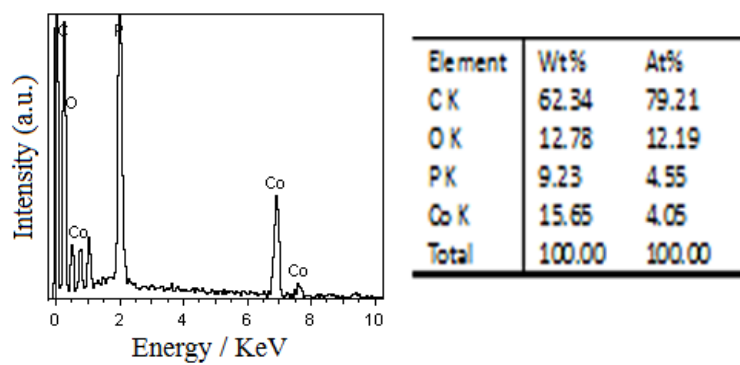


Fig. S4. EDS spectrum of CoP/RGO-0.36 composite.

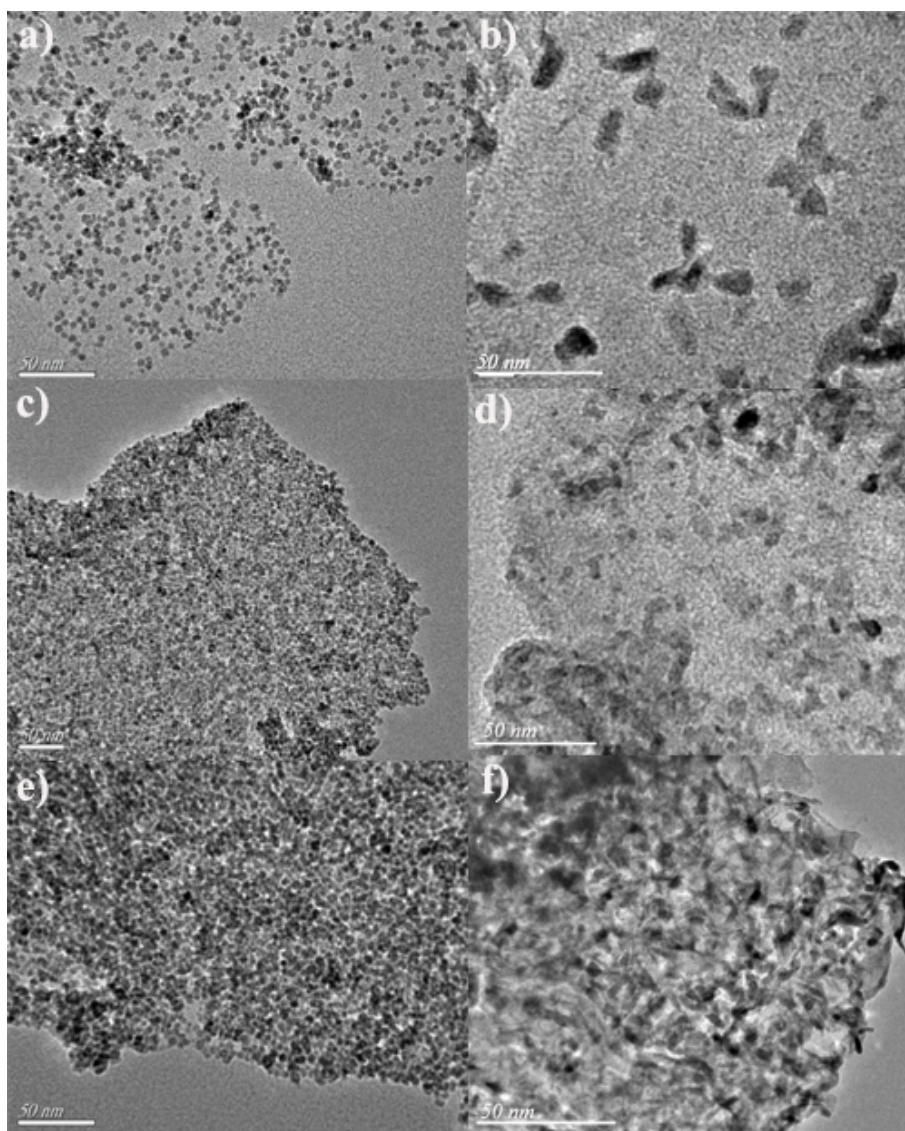


Fig. S5. TEM images of (a) Co₃O₄/RGO-0.18, (b) CoP/RGO-0.18, (c) Co₃O₄/RGO-0.54, (d) CoP/RGO-0.54, (e) Co₃O₄/RGO-0.72, and (f) CoP/RGO-0.72 composites

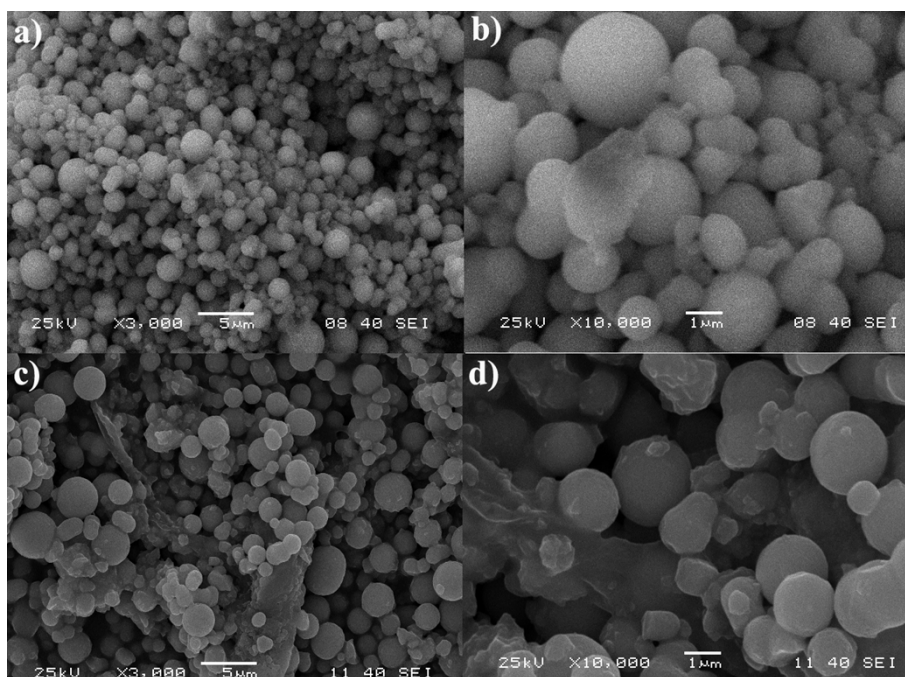


Fig. S6. SEM images of (a,b) pure Co_3O_4 and (c,d) CoP nanoparticles.

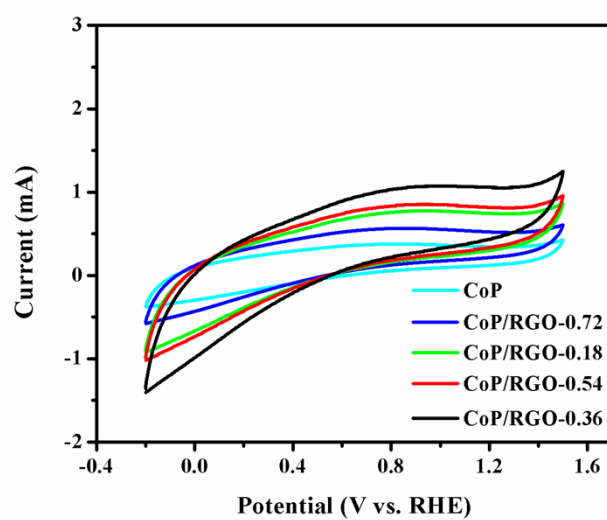


Fig. S7. CV plots of the CoP/RGO composites and pure CoP as electrocatalysts at the scan rate of 40 mV s^{-1} .

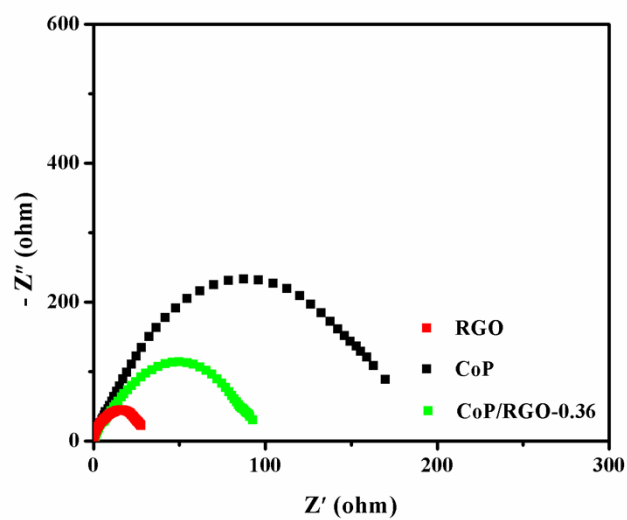


Fig. S8. Nyquist plots of CoP/RGO-0.36, pure CoP and RGO record at $\eta = 40$ mV in 0.5 M H_2SO_4 solution.

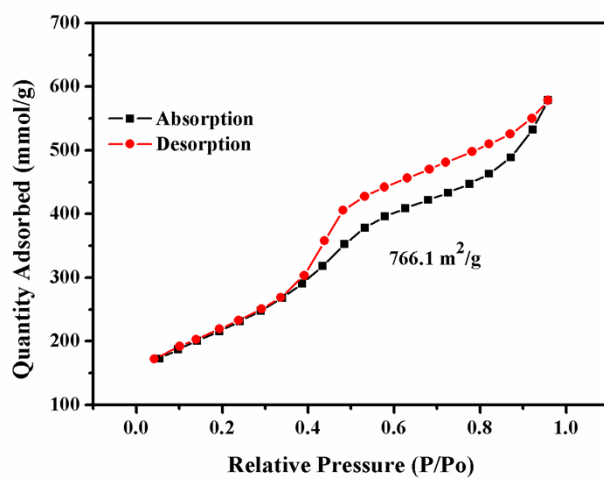


Fig. S9. Nitrogen adsorption and desorption isotherms of RGO.

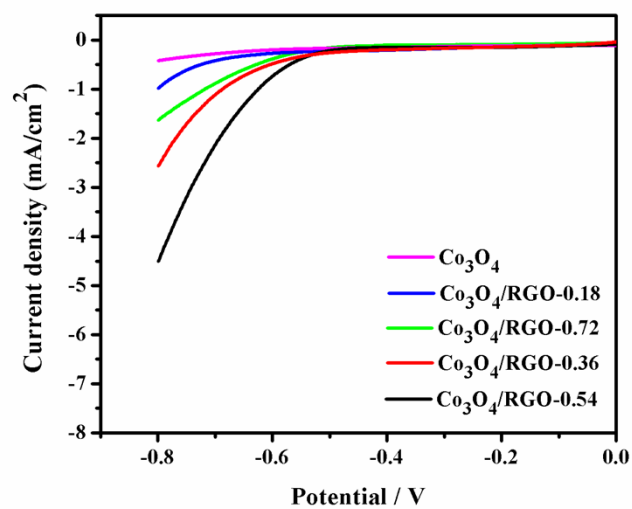


Fig. S10. LSV polarization curves of Co₃O₄ and Co₃O₄/RGO electrodes at the scan rate of 2 mV s⁻¹ at 298 K.

Table S1. Kinetic parameters of pure CoP and CoP/RGO-0.36 electrodes.

Electrode	T (K)	Tafel slope (mV per decade)	Exchange current density ($A\ cm^{-2}$)	E_a (kJ/mol)
CoP	298	149.6	6.3×10^{-7}	82.7
	308	141.4	7.9×10^{-6}	
	318	137.1	1.3×10^{-4}	
	328	131.3	6.3×10^{-4}	
CoP/RGO-0.36	298	104.8	4.0×10^{-5}	41.4
	308	101.9	1.0×10^{-4}	
	318	95.6	4.0×10^{-4}	
	328	94.1	1.3×10^{-3}	