

One-step Hydrothermal Synthesis of NiCo₂S₄-rGO as an Efficient Electrode for Oxygen Reduction Reaction

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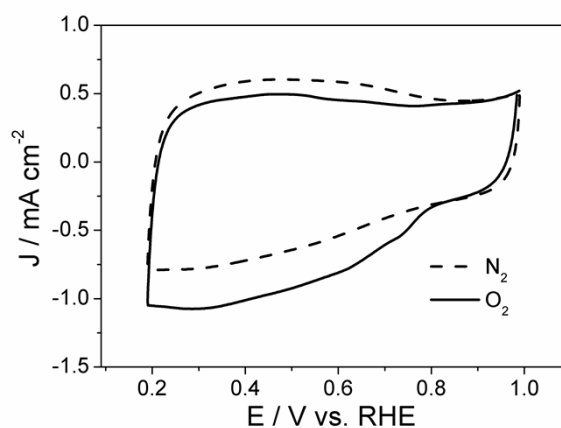


Fig. S1 Cyclic voltammetry (CV) curves of ORR on rGO in N₂- and O₂-saturated 0.1M KOH solutions at a scan rate of 10 mV s⁻¹.

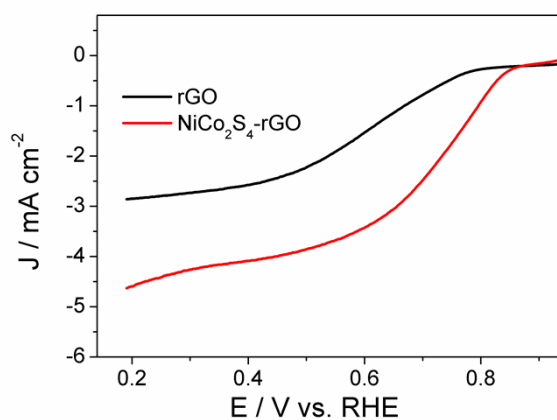


Fig. S2 RDE curves of rGO, NiCo₂S₄-rGO in O₂-saturated 0.1 M KOH at 1600 rpm with a sweep

rate of 10 mV s^{-1} .

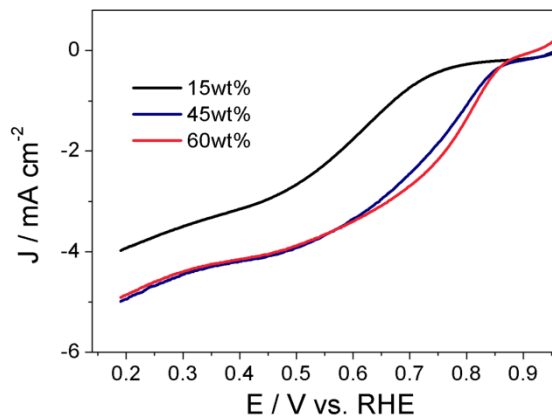


Fig. S3 RDE curves of NiCo₂S₄-rGO with different NiCo₂S₄ mass loading in O₂-saturated 0.1 M KOH at 1600 rpm with a sweep rate of 10 mV s^{-1} .

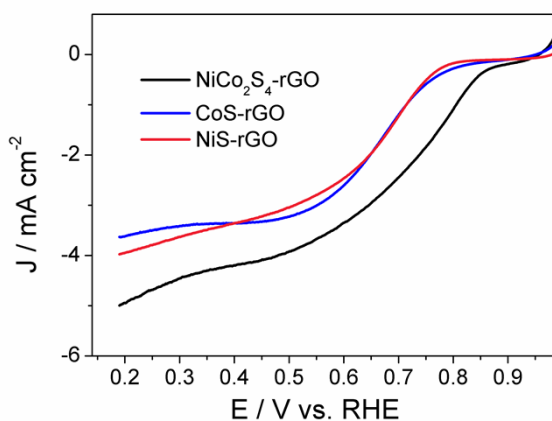


Fig. S4 RDE curves of NiCo₂S₄-rGO, CoS-rGO and NiS-rGO in O₂-saturated 0.1 M KOH at 1600 rpm with a sweep rate of 10 mV s^{-1} .

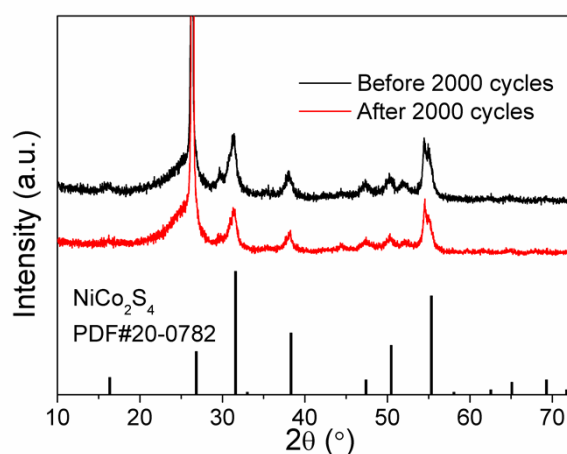


Fig. S5 XRD patterns of NiCo₂S₄ on carbon paper before and after 2000 CV cycles in 0.1M KOH.

The sharp peak at around 26° is attributed to carbon paper.

Table S1 Comparison of our NiCo₂S₄-rGO with other NiCo mixed sulfides or oxides in literatures on ORR catalytic activity in 0.1 M KOH

Catalyst	Synthetic method	T _R	E _{onset}	vs.	RHE	E _{peak}	vs.	RHE	Ref.
NiCo ₂ S ₄ -rGO	One step hydrothermal	180°C	-0.11	vs.	0.88	-0.2	vs.	0.79	In this work
NiCo ₂ S ₄ sub-micron spheres	Solution-based method	220°C	-0.05	vs.	0.928	-0.22	vs.	0.758	[1]
NiCo ₂ O ₄ -rGO	Two step solution-based method	160/300 °C	-0.073	vs.	0.891	-0.349	vs.	0.615	[2]
NiCo ₂ O ₄	electrospinning	450°C annealing	0.93	vs.	0.93	-	vs.	-	[3]
NiCo ₂ S ₄ @grap hene	solvothermal	200°C	-0.11	vs.	0.854	-0.22	vs.	0.744	[4]

References:

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2. G. Zhang, B. Y. Xia, X. Wang and X. W. Lou, *Adv. Mater.*, 2014, **26**, 2408.
3. M. Prabu, K. Ketpang and S. Shanmugam, *Nanoscale*, 2014, **6**, 3173.
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