Supporting Information

In-situ template synthesis of hollow nanospheres assembled from

NiCo₂S₄@C ultrathin nanosheets with high electrochemical activities

for lithium storage and ORR catalysis

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Fig.S1 Typical SEM image of pure NiCo₂S₄ HNAs

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Fig.S2 Typical SEM image of NiCo₂S₄@C HNSs after 200 cycles at a current density



of 500 mA g⁻¹

Fig.S3 Cross sectional SEM images of NiCo₂S₄@C electrode after 10 cycles at a current density of 500 mA g^{-1}

The volumetric capacity of the $NiCo_2S_4@C$ electrode was calculated by the following:

The thickness of the NiCo₂S₄@C electrode was estimated by SEM in Fig.S3 to be ~ 80 μ m in which mass loading of an electrode is ~1.2 mg cm⁻². The mass density (ρ) of the NiCo₂S₄@C electrode is: $\rho = m (mg) / v (cm^3) = 1.2 mg cm^{-2} / 80 \mu m = 150 mg cm^{-3}$. According to the results of our manuscript, the gravimetric capacity (Cg) of NiCo₂S₄@C electrode is 1592 mA h g⁻¹ at the current density of 500 mA g⁻¹. Therefore, the volumetric capacity (Cv) is calculated: Cv = Cg × ρ = ~ 238.8 mA h cm⁻³ for NiCo₂S₄@C HNSs.



Fig. S4 ORR LSV curves of pure $NiCo_2S_4$ HNAs catalysts in O_2 -saturated 0.1 M

KOH at different rotating rates