**Synergistic effect of surface reconstruction and rGO for FeS2/rGO electrocatalysis with efficient oxygen evolution reaction for water splitting**

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Fig. S1: The XRD patterns of Fe2O3/rGO



Fig. S2: Cyclic voltammetry curves of (a) bare Ni foam, (b) FeS2-400/NF, (c) FeS2-450/NF, (d) FeS2-550/NF, (e) FeS-650/NF and (f) FeS-750/NF in 1.0 M KOH at different scan rates

In order to better understand the intrinsic activity, the turnover frequency (TOF) of all the samples for OER at the same potential had been provided.

To calculate the per-site turnover frequency (TOF), we used the following formula1:



The total number of oxygen turn overs was calculated from the current density according to the following conversion:



Since the exact oxygen binding site is not known, we estimate the number of sites as the number of sample molecular calculated based on the mass of the samples used in the electrochemical measurements according to the following conversion:







Based on the current density at the same overpotential (369 mV), the per site TOF is determined as follows:







According to the above calculations, the TOF value of FeS2 for OER at the overpotential 369 mV is higher, indicating the better catalytic activity.



Fig. S3: Cyclic voltammetry curves of (a) bare Ni foam, (b) FeS2-450/NF, (c) FeS2-450/rGO-5%/NF, (d) FeS2-450/rGO-10%/NF and (e) FeS2-450/rGO-15%/NF in 1.0 M KOH at different scan rates