

ELECTRONIC SUPPLEMENTARY INFORMATION

Sulfur-doped Graphene / Transition Metal Dichalcogenide Heterostructured Hybrids with Electrocatalytic Activity Toward the Hydrogen Evolution Reaction

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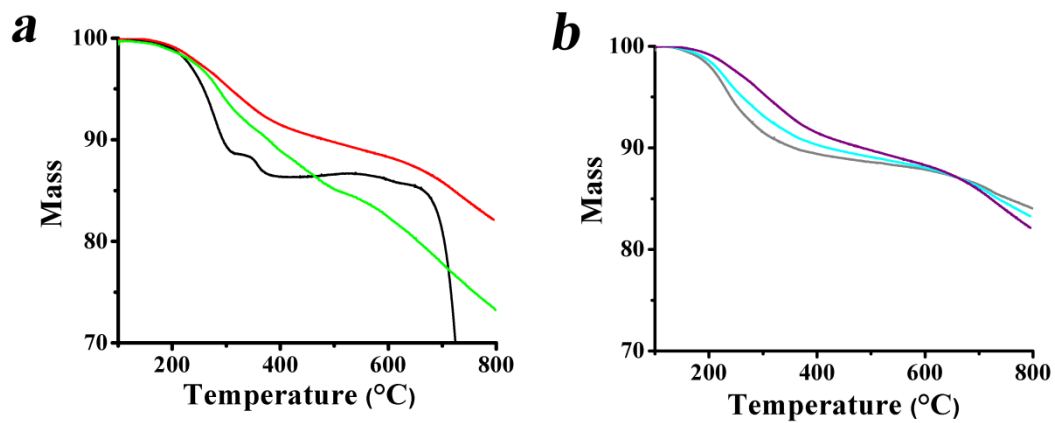


Figure S1. Thermogravimetric analysis graphs for (a) SG/MoS₂ (3:1) (red), SG/MoS₂ (1:1) (green), and MoS₂ (black), and (b) SG/WS₂ (3:1) (purple), SG/WS₂ (1:1) (cyan), and WS₂ (grey), obtained under nitrogen.

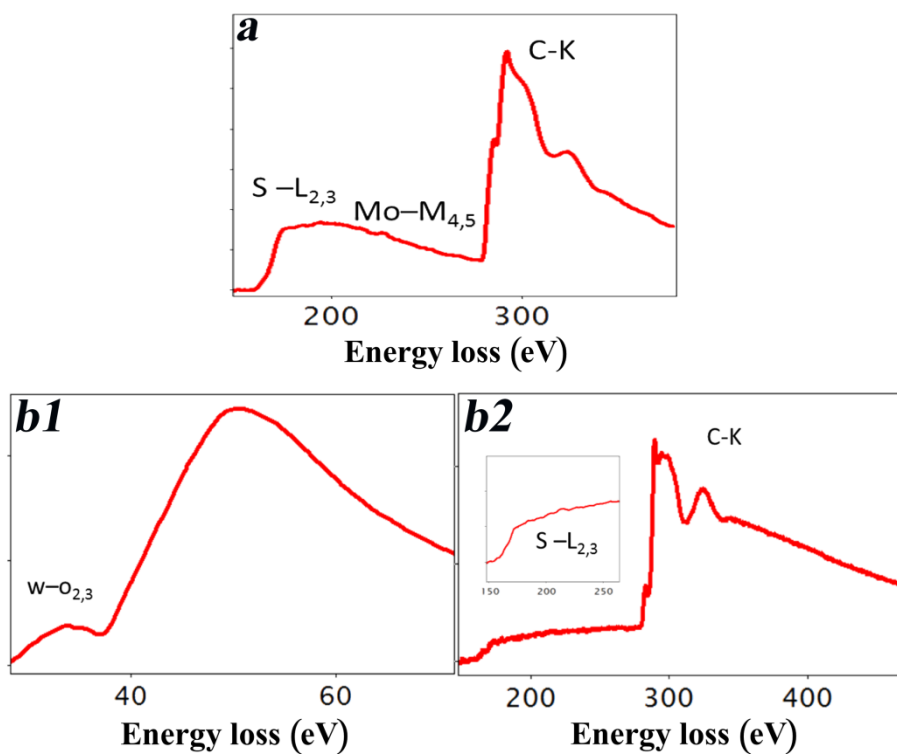


Figure S2. (a) EEL spectrum of material displayed in Figure 4c, showing the C-K, S-L_{2,3} and Mo-M_{4,5} edges. (b1, b2) EEL spectra of material displayed in Figure 4f, showing the C-K, S-L_{2,3} and W-O_{2,3} edges.

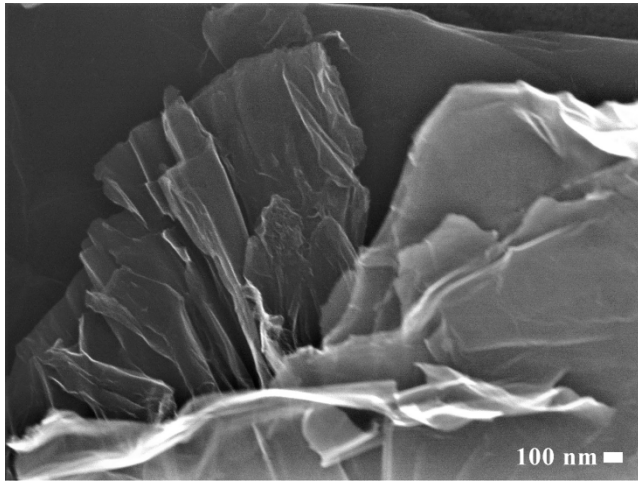


Figure S3. Representative SEM image of SG.

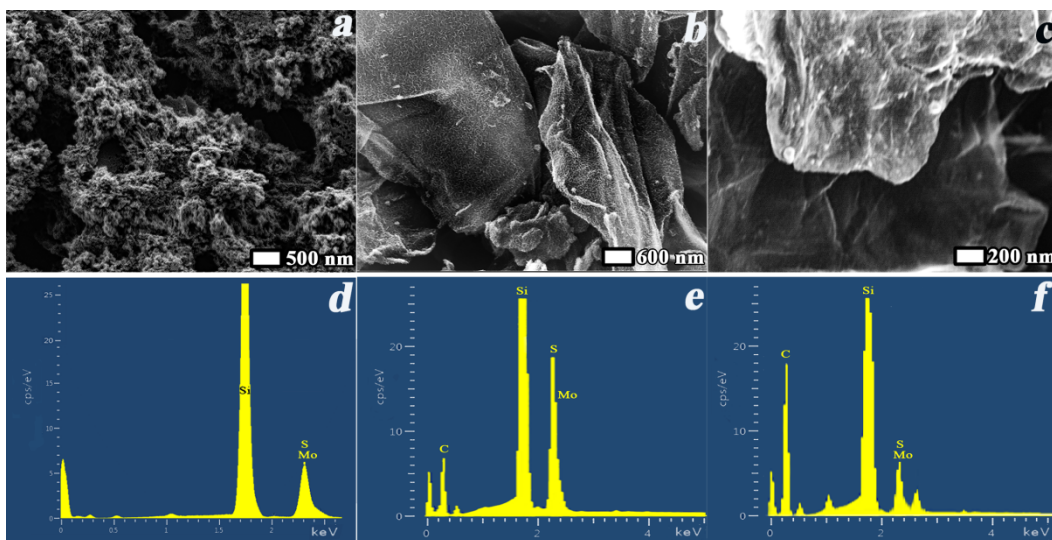


Figure S4. SEM images for (a) MoS₂, (b) SG/MoS₂ (1:1), and (c) SG/MoS₂ (3:1). EDS for (d) MoS₂, (e) SG/MoS₂ (1:1), and (f) SG/MoS₂ (3:1). The presence of Si is due to the sample holder.

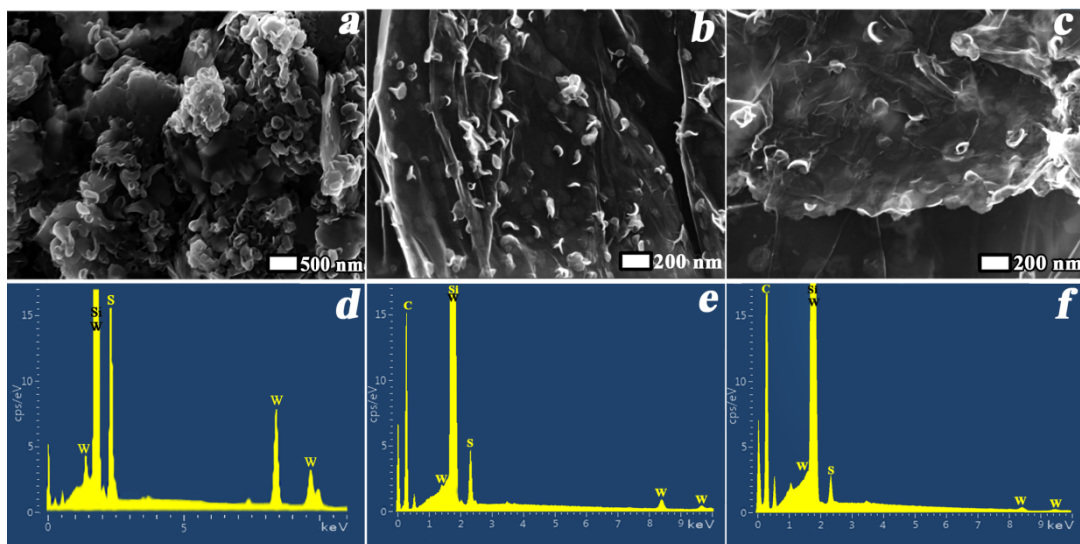


Figure S5. SEM images for (a) WS₂, (b) SG/WS₂ (1:1), and (c) SG/WS₂ (3:1). EDS for (d) WS₂, (e) SG/WS₂ (1:1), and (f) SG/WS₂ (3:1). The presence of Si is due to the sample holder.

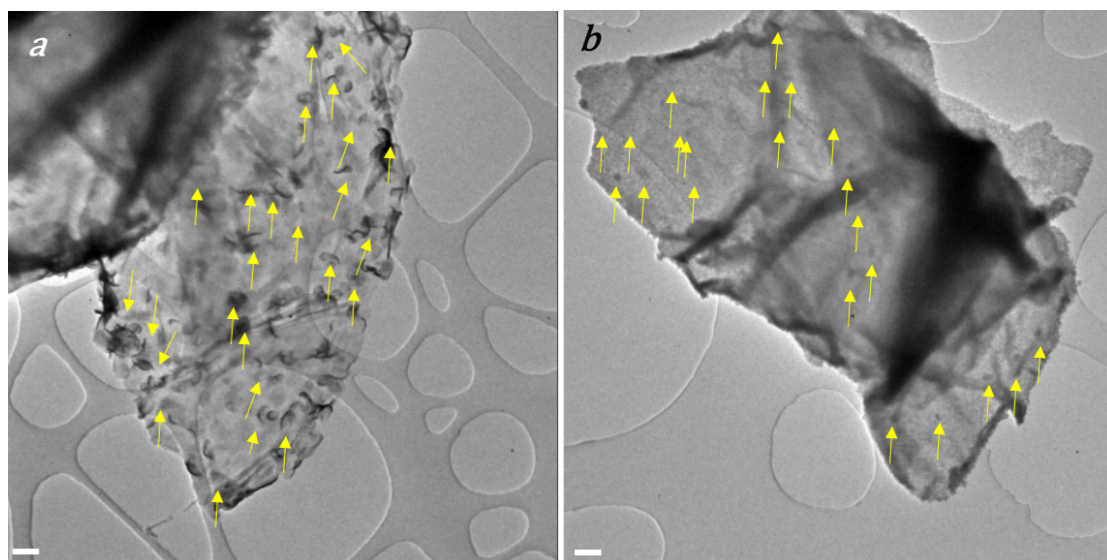


Figure S6. Low magnification TEM images of (a) SG/MoS₂ (1:1), and (b) SG/WS₂, (1:1). Typical MoS₂ and WS₂ features are highlighted with yellow arrows. The scale bar is 200 nm.

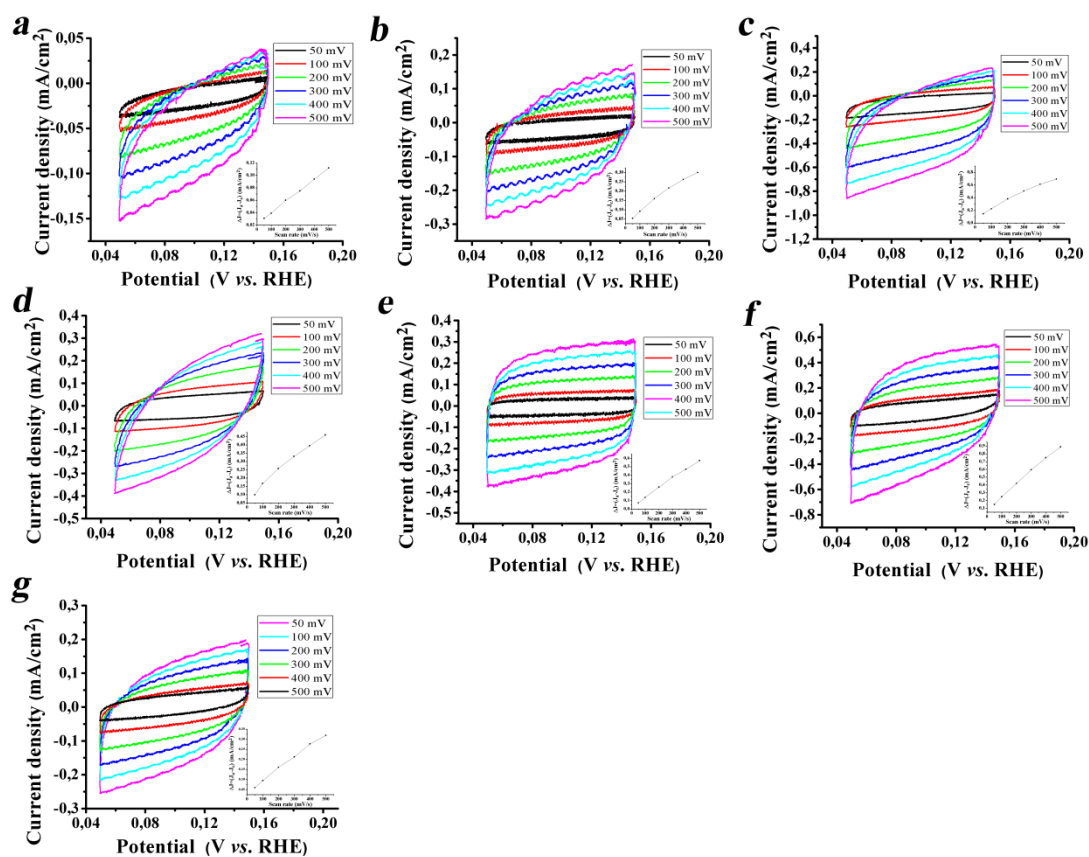


Figure S7. Cyclic voltammograms of (a) MoS₂, (b) SG/MoS₂ (1:1), (c) SG/MoS₂ (3:1), (d) WS₂, (e) SG/WS₂ (1:1), (f) SG/WS₂ (3:1) and (g) SG measured in a nitrogen saturated aqueous 0.5 M H₂SO₄ electrolyte, at a rotation speed of 1,600 rpm and scan rates from 50 to 500 mV/s. Inset: images of the scan rate dependence of the current densities for the corresponding materials.

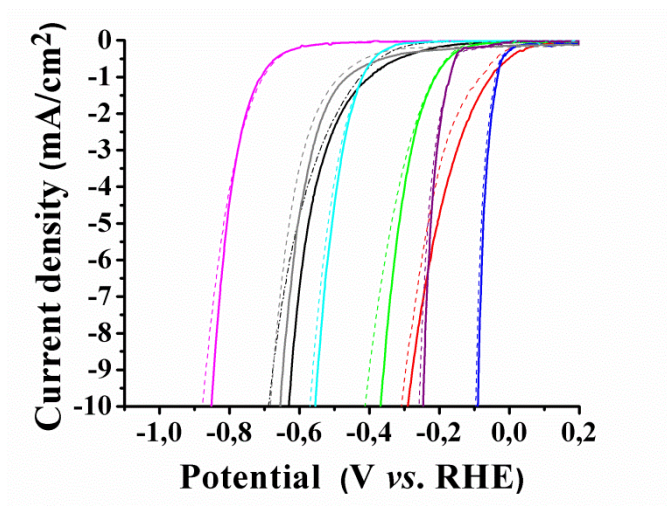


Figure S8. LSV for HER of (a) SG/MoS₂ (3:1) (red), SG/MoS₂ (1:1) (green), MoS₂ (black), SG/WS₂ (3:1) (purple), SG/WS₂ (1:1) (cyan), WS₂ (grey), SG (pink) and Pt/C (blue) (solid lines) before after 1,000 cycles (dashed lines). The LSV polarization curves were obtained in a nitrogen saturated aqueous 0.5 M H₂SO₄ electrolyte, at a rotation speed of 1,600 rpm and scan rate of 5 mV/s.