

Electronic Supplementary Information

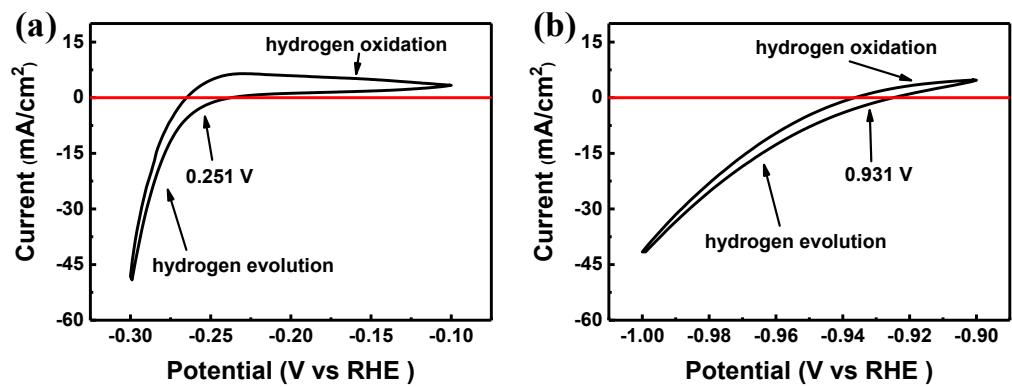
**Scalable synthesis of porous hollow CoSe<sub>2</sub>-MoSe<sub>2</sub>/carbon microspheres for highly efficient hydrogen evolution reaction in acidic and alkaline media**

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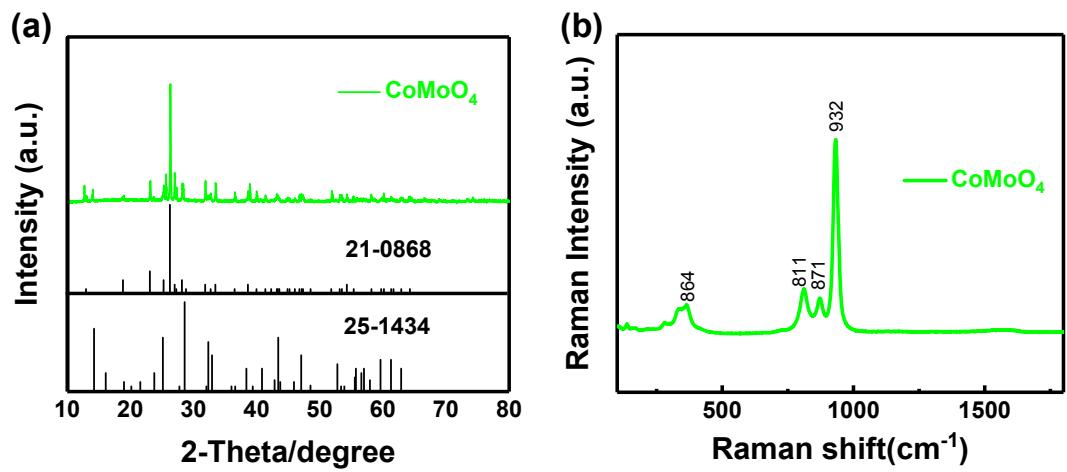
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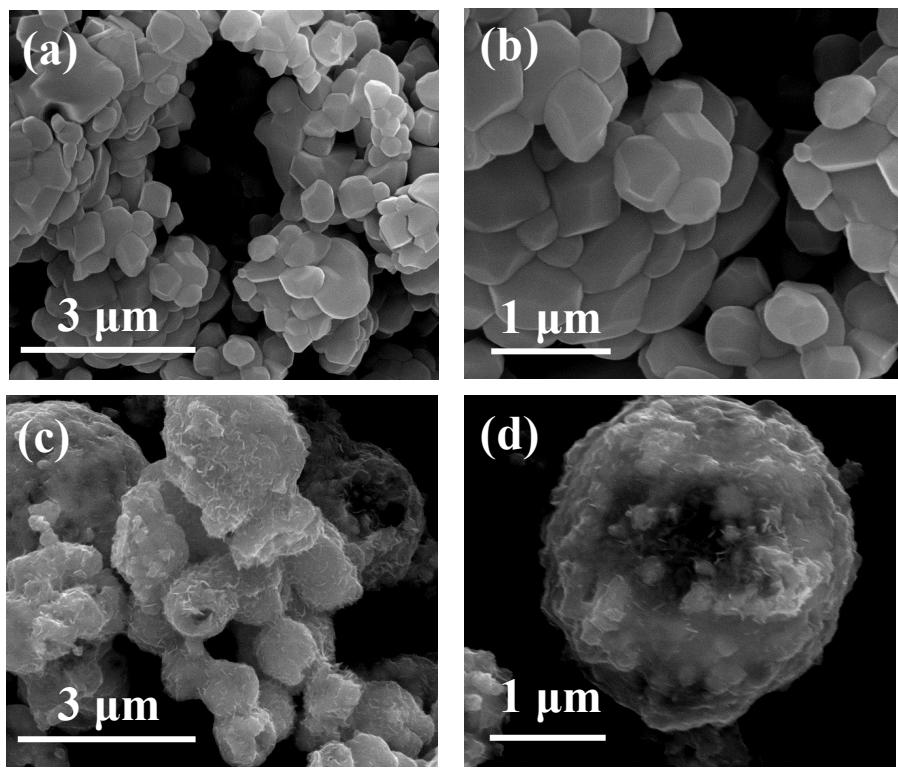
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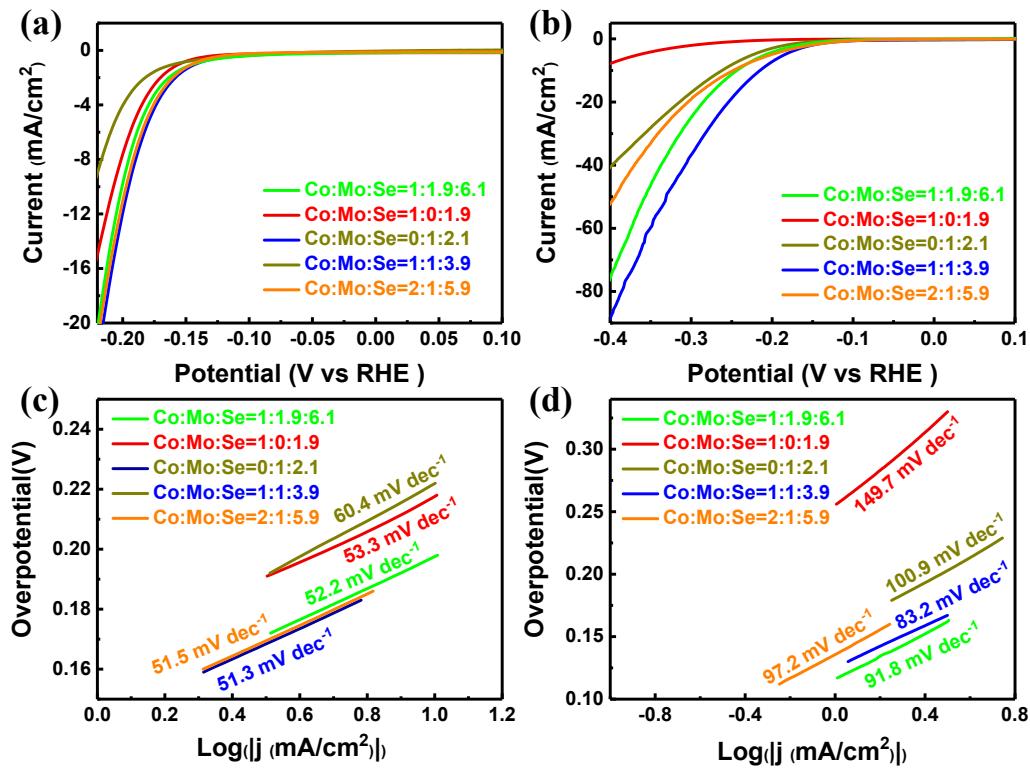
**Fig. S1.** Voltammograms of two platinum wire electrodes as the working and counter electrodes at a scan rate of  $1 \text{ mV s}^{-1}$  in (a)  $0.5 \text{ M H}_2\text{SO}_4$ , (b)  $1 \text{ M KOH}$ .



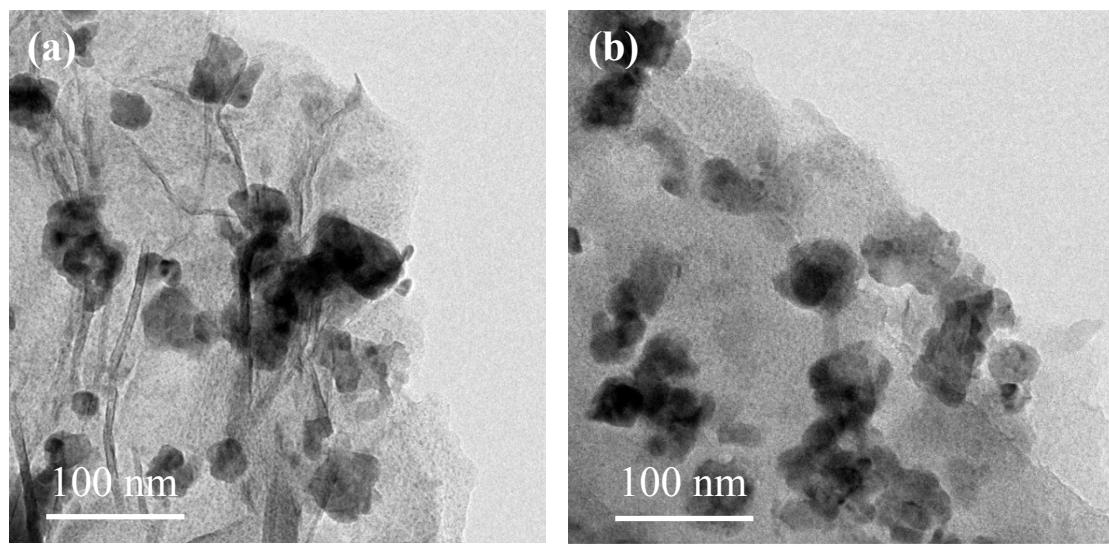
**Fig. S2.** (a) The XRD patterns and (b) the Raman spectra of CoMoO<sub>4</sub>



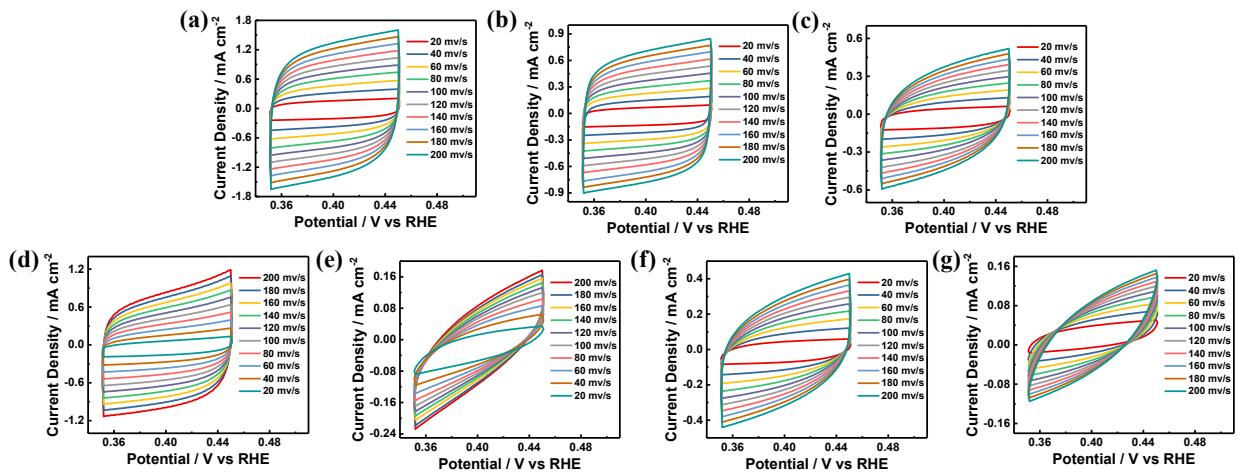
**Fig. S3.** (a-b) SEM images of  $\text{CoMoO}_4$ , (c-d) SEM image of CS-MS/C



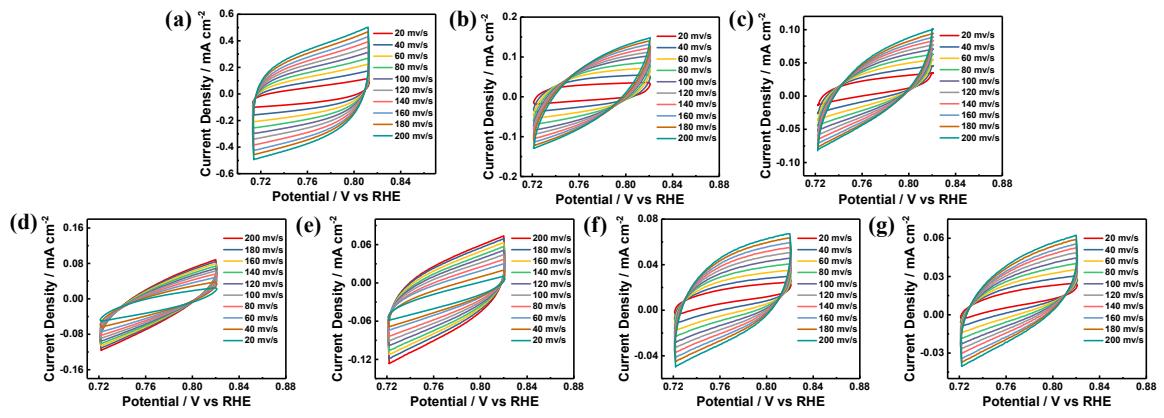
**Fig. S4.** The HER performance of samples that have different molar ratio of Co, Mo and Se. Polarization curves in (a)  $0.5 \text{ M H}_2\text{SO}_4$  and (b)  $1 \text{ M KOH}$ . Corresponding Tafel plots in (c)  $0.5 \text{ M H}_2\text{SO}_4$  and (d)  $1 \text{ M KOH}$ .



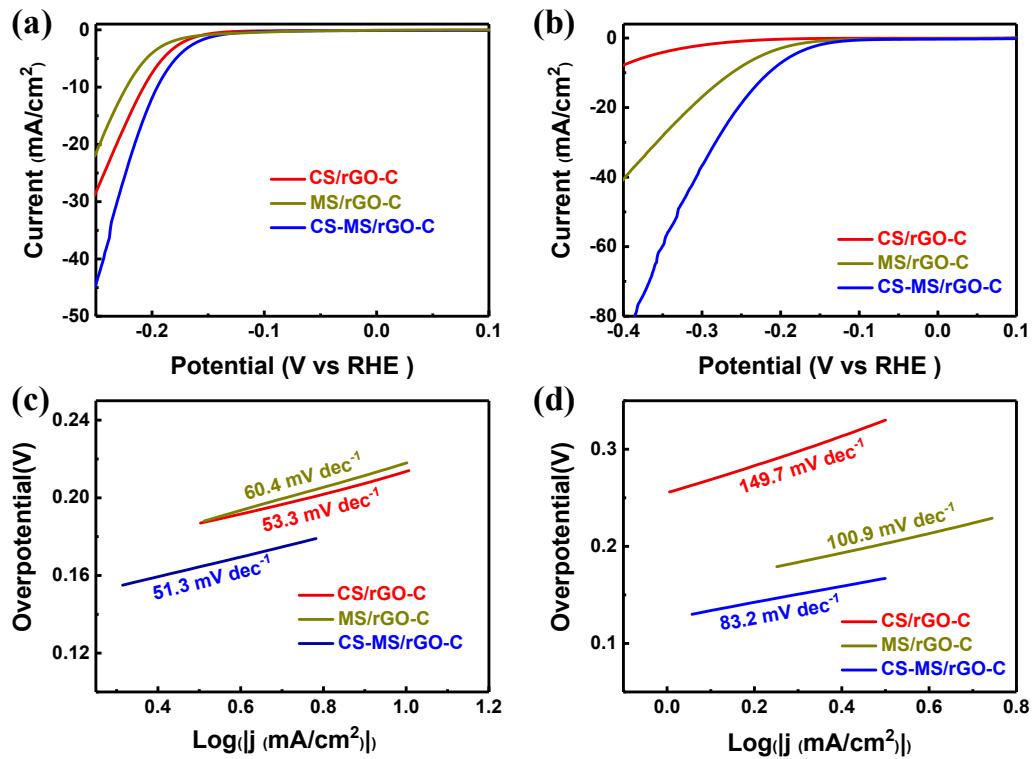
**Fig. S5** The TEM image of CS-MS/rGO-C before (a) and after (b) long time stability test.



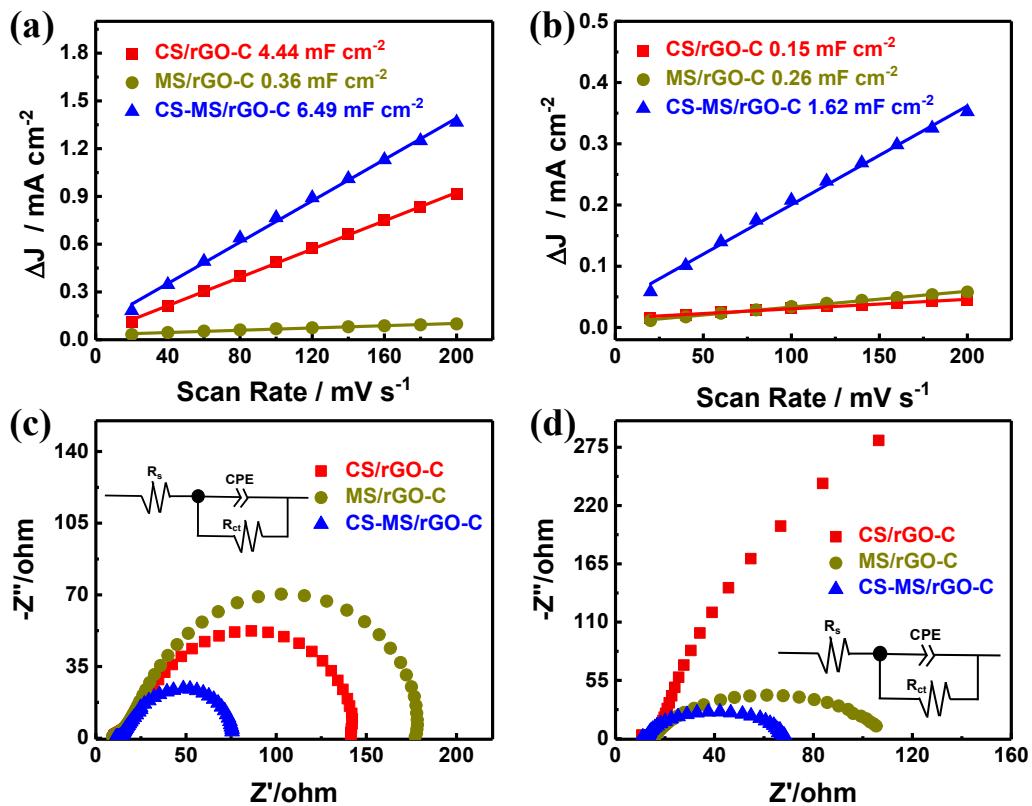
**Fig. S6** Voltammograms of (a) CS-MS/rGO-C, (b) CS-MS/C, (c) CS-MS/rGO, (d) CS/ rGO-C, (e) MS/rGO-C, (f) CS-MS and (g) CoMoO<sub>4</sub> in 0.5 M H<sub>2</sub>SO<sub>4</sub>.



**Fig. S7.** Voltammograms of (a) CS-MS/rGO-C, (b) CS-MS/C, (c) CS-MS/rGO, (d) CS/rGO-C, (e) MS/rGO-C, (f) CS-MS and (g) CoMoO<sub>4</sub> in 1 M KOH.



**Fig. S8.** The HER performance of CS/rGO-C, MS/rGO-C and CS-MS/rGO-C. Polarization curves in (a) 0.5 M  $\text{H}_2\text{SO}_4$  and (b) 1 M KOH. Corresponding Tafel plots of CS/rGO-C, MS/rGO-C and CS-MS/rGO-C in (c) 0.5 M  $\text{H}_2\text{SO}_4$  and (d) 1 M KOH.



**Fig. S9.** Estimated  $C_{dl}$  and relative electrochemically active surface area for CS/rGO-C, MS/rGO-C and CS-MS/rGO-C in (a)  $0.5 \text{ M H}_2\text{SO}_4$  and (b)  $1 \text{ M KOH}$ . Nyquist plots ( $100 \text{ kHz}-10 \text{ mHz}$ ) of CS/rGO-C, MS/rGO-C and CS-MS/rGO-C at (c)  $-0.179 \text{ V}$  vs RHE in  $0.5 \text{ M H}_2\text{SO}_4$  and (d)  $-0.239 \text{ V}$  vs RHE in  $1 \text{ M KOH}$ .