

## Supporting information

### Heterogeneous CoS<sub>2</sub>/MS<sub>2</sub> Microspheres for Efficient Oxygen Evolution Reaction

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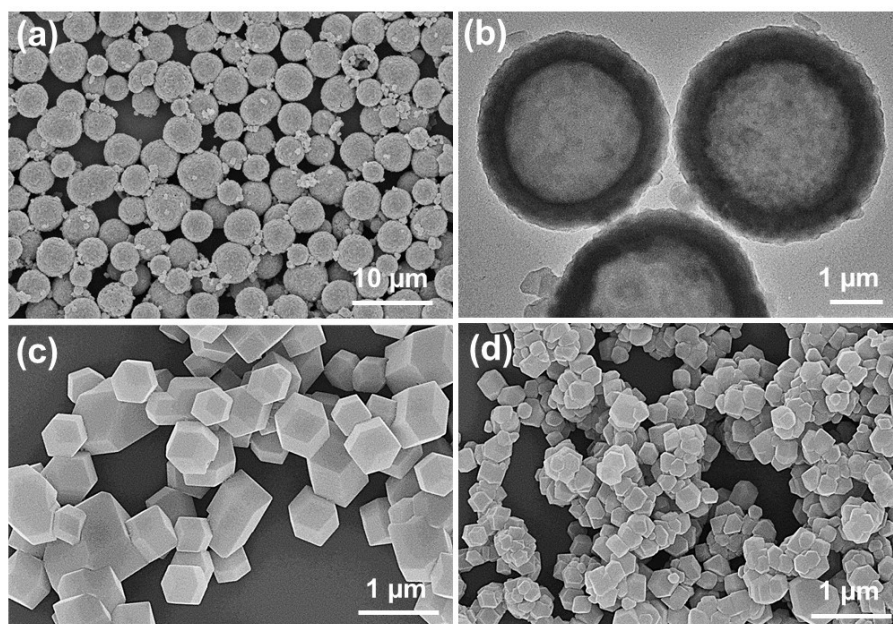
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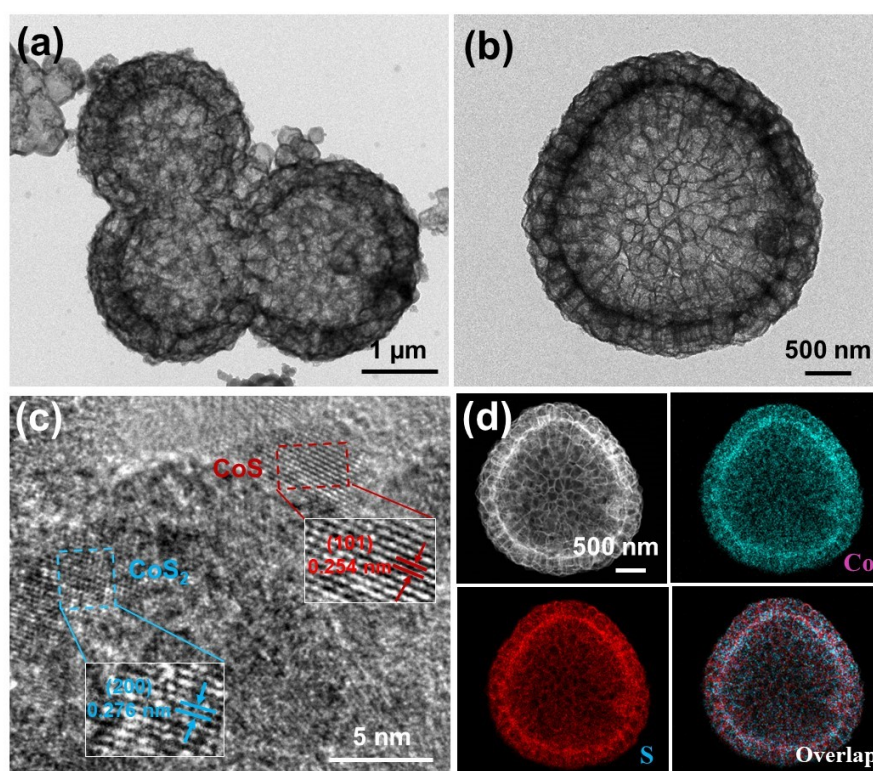
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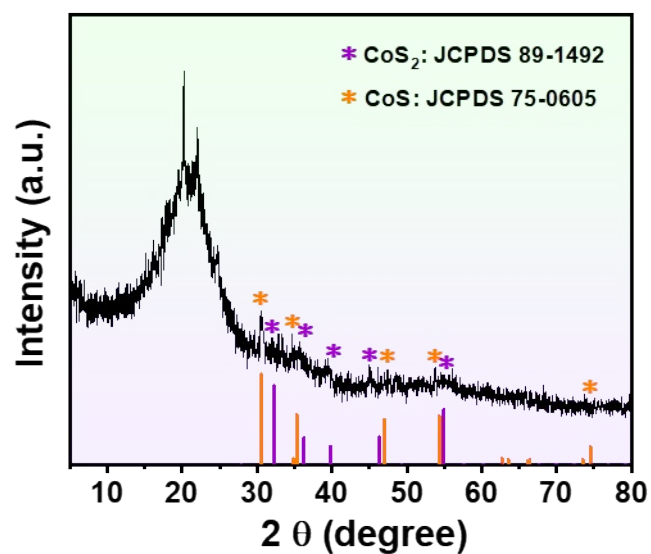
<sup>1</sup> These authors contributed equally to the work.



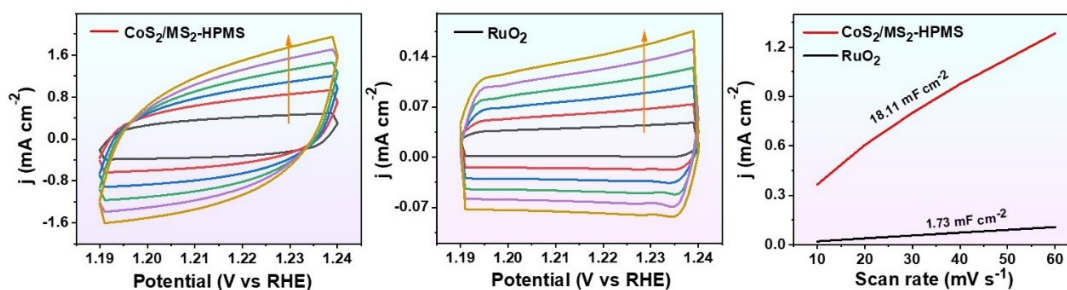
**Fig. S1** SEM images (a) and TEM images (b) of ZIF-67-HMS synthesized in DES, (c and d) SEM images of ZIF-67 polyhedrons synthesized in methanol and ethanol, respectively.



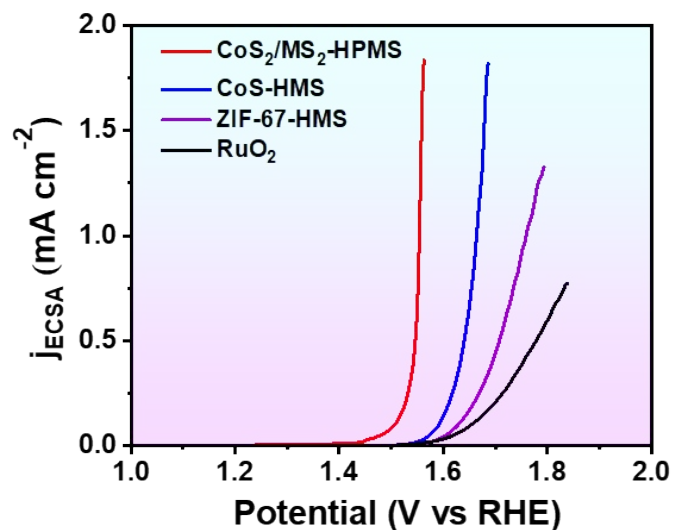
**Fig. S2** TEM images (a and b), HRTEM image (c), HAADF-STEM image and corresponding EDS mapping (d) of CoS/CoS<sub>2</sub>-HMS.



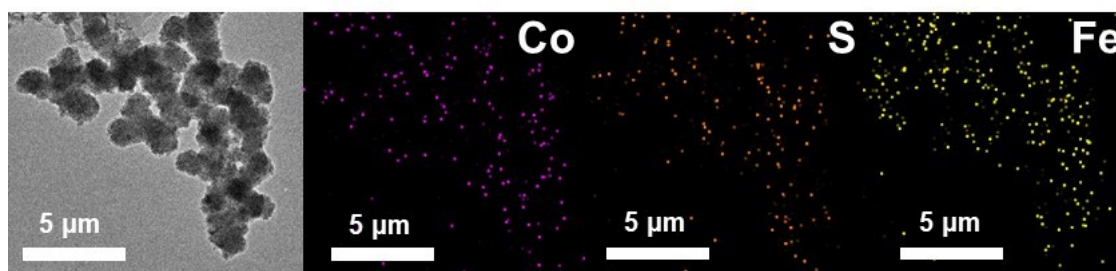
**Fig. S3** XRD pattern of CoS/CoS<sub>2</sub>-HMS.



**Fig. S4** CV curves of CoS<sub>2</sub>/MS<sub>2</sub>-HPMS (a) and commercial RuO<sub>2</sub> (b) in the potential range of non-Faradaic region (1.19–1.24 V vs. RHE). (c) The linear fitted line of  $\Delta j$  vs scan rate ( $v$ ) in the corresponding CV curves.

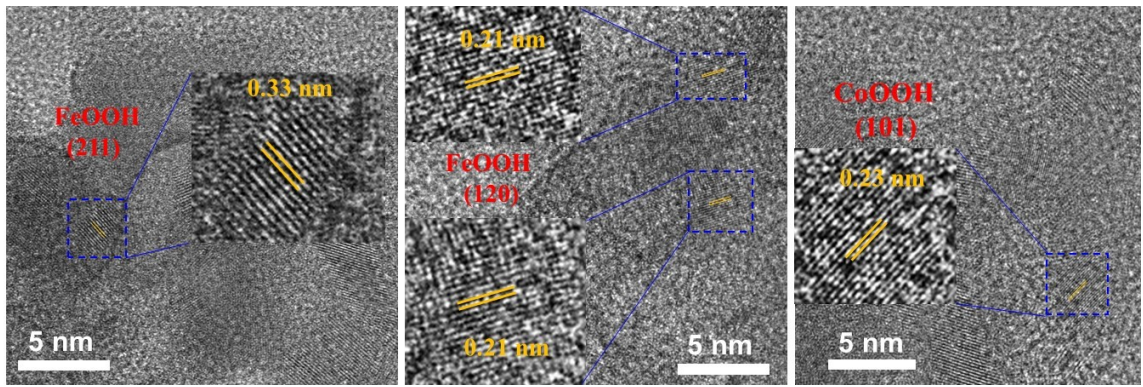


**Fig. S5** ECSA-normalized LSV curves of ZIF-67-HMS, CoS/CoS<sub>2</sub>-HMS, CoS<sub>2</sub>/MS<sub>2</sub>-HPMS, and commercial RuO<sub>2</sub>.



**Fig. S6** The TEM-mapping images of  $\text{CoS}_2/\text{MS}_2\text{-HPMS}$  after operating 5000 cycles of CV in 1 M KOH alkaline solution at the scan rate of  $100 \text{ mV s}^{-1}$ .





**Fig. S7** The HRTEM of  $\text{CoS}_2/\text{MS}_2\text{-HPMS}$  after operating 5000 cycles of CV in 1 M KOH alkaline solution at the scan rate of  $100 \text{ mV s}^{-1}$ .



**Fig. S8** The Fe 2p and Co 2p of  $\text{CoS}_2/\text{MS}_2\text{-HPMS}$  after operating 5000 cycles of CV in 1 M KOH alkaline solution at the scan rate of  $100 \text{ mV s}^{-1}$  after

**Table S1.** Comparisons of catalytic performance of CoS<sub>2</sub>/MS<sub>2</sub>-HPMS and other bimetallic sulfide electrocatalysts reported recently for OER.

Catalysts	Electrolyte	Overpotential at 10 mA cm <sup>-2</sup> (mV)	Tafel slope (mV dec <sup>-1</sup> )	References
Co <sub>3</sub> S <sub>4</sub> @MoS <sub>2</sub>	1 M KOH	330	59	1
CoMoS-600	1 M KOH	350	64	2
CC/CNTs@CoS <sub>0.74</sub> Se <sub>0.52</sub>	1 M KOH	285	63	3
Co <sub>9</sub> S <sub>8</sub> /S-CNTs	1 M KOH	331	88	4
CuS@CoS <sub>2</sub>	1 M KOH	230	67	5
Co <sub>3</sub> S <sub>4</sub> @MoS <sub>2</sub>	1 M KOH	280	43	6
ZnCoS-NSCNT/NP	1 M KOH	270	73	7
CeO <sub>2</sub> @CoS/MoS <sub>2</sub>	1 M KOH	247	64	8
NiCoS/Ti <sub>3</sub> C <sub>2</sub> T <sub>x</sub>	1 M KOH	365	58	9
FeS <sub>2</sub> /CoS <sub>2</sub> NSs	1 M KOH	340	76	10
<b>CoS<sub>2</sub>/MS<sub>2</sub>-HPMS</b>	<b>1 M KOH</b>	<b>217</b>	<b>65</b>	<b>This work</b>

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