Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

MOF-Derived $CoSe_2$ Microspheres with Hollow Interiors as High-Performance Electrocatalysts for Enhanced Oxygen Evolution Reaction

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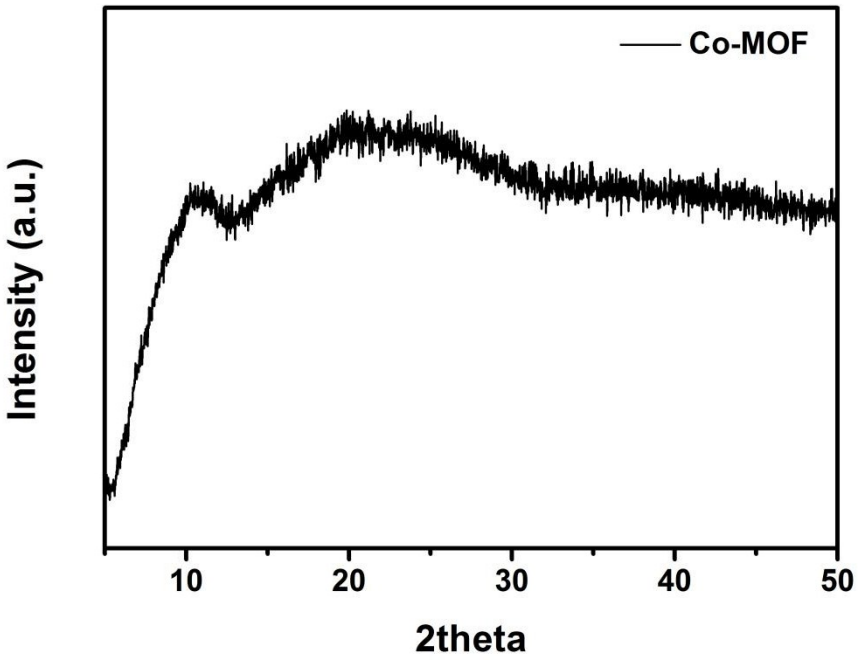

Fig. S1 XRD pattern of Co-MOF.

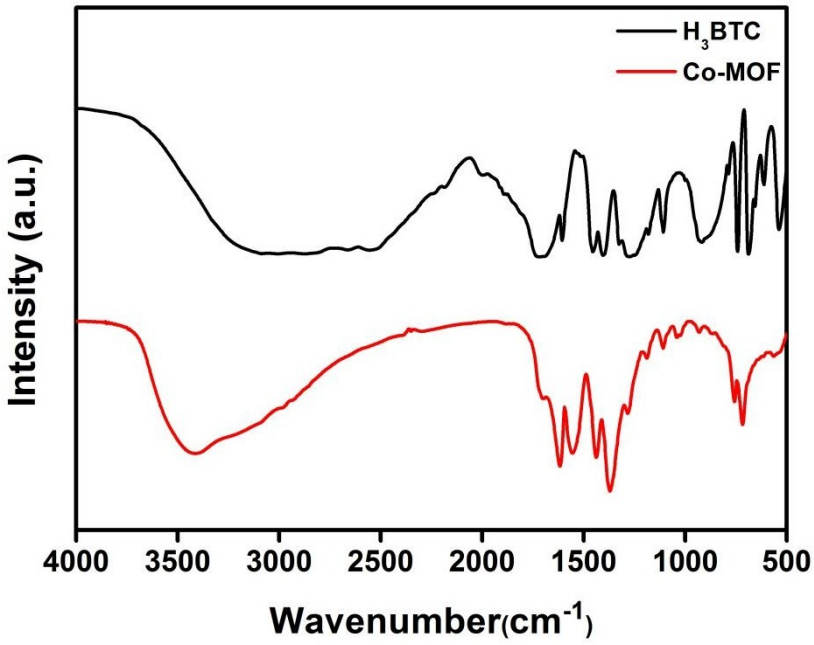

Fig. S2 FT-IR spectra of Co-MOF and H_3BTC.

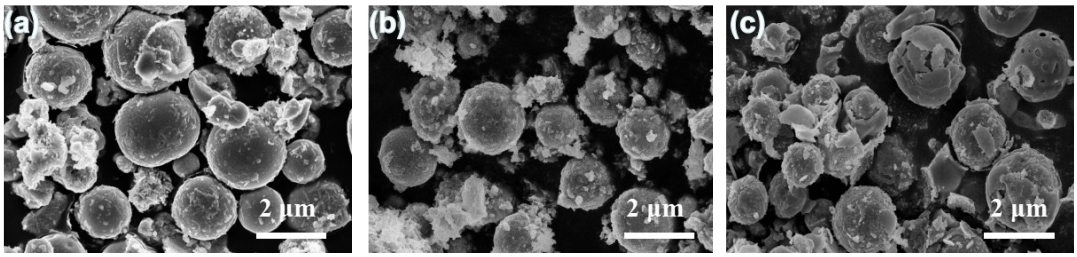

Fig. S3 SEM images of (a) $CoSe_2$-400, (b) $CoSe_2$-450, and (c) $CoSe_2$-550.

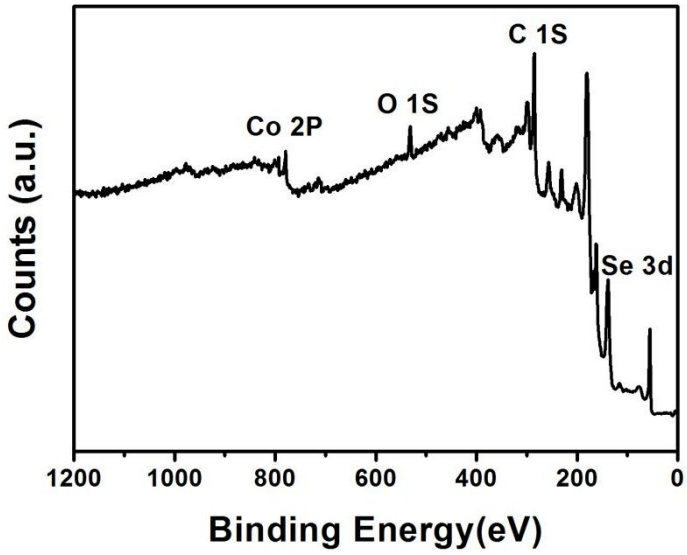

Fig. S4 Survey XPS spectrum of $CoSe_2$-450.

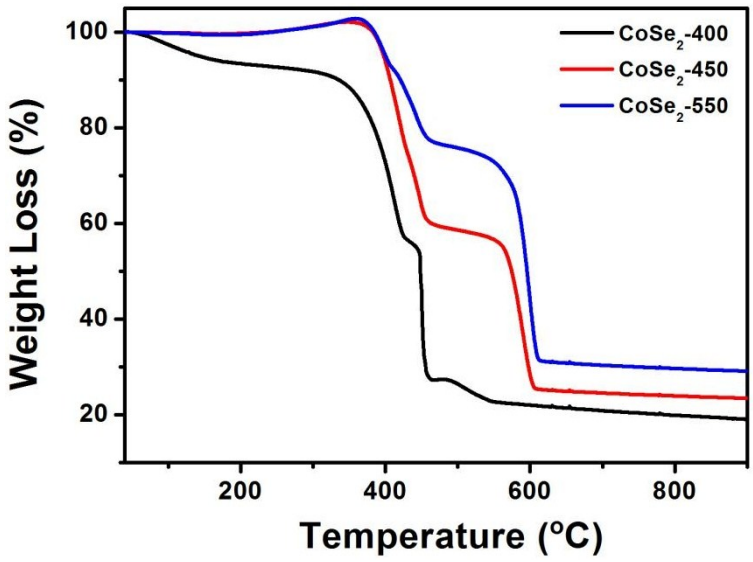

Fig. S5 TGA plots of $CoSe_2$-400, $CoSe_2$-450, and $CoSe_2$-550.

Table S1. The contents of $CoSe_2$ and carbon of $CoSe_2$-400, $CoSe_2$-450 and $CoSe_2$-550.

$$3CoSe_2\ (s) + 2O_2\ (g) = Co_3O_4\ (s) + 6Se\ (g)$$

Catalysts	$CoSe_2$ (%)	C (%)
$CoSe_2$-400	78.8	21.2
$CoSe_2$-450	64.1	35.9
$CoSe_2$-550	52.6	47.4

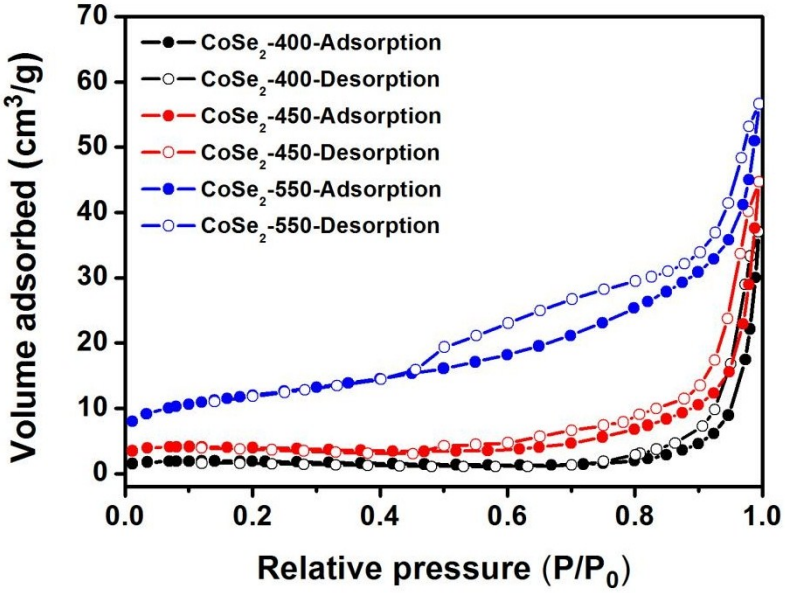

Fig. S6 Nitrogen adsorption-desorption isotherms of $CoSe_2$-400, $CoSe_2$-450, and $CoSe_2$-550.

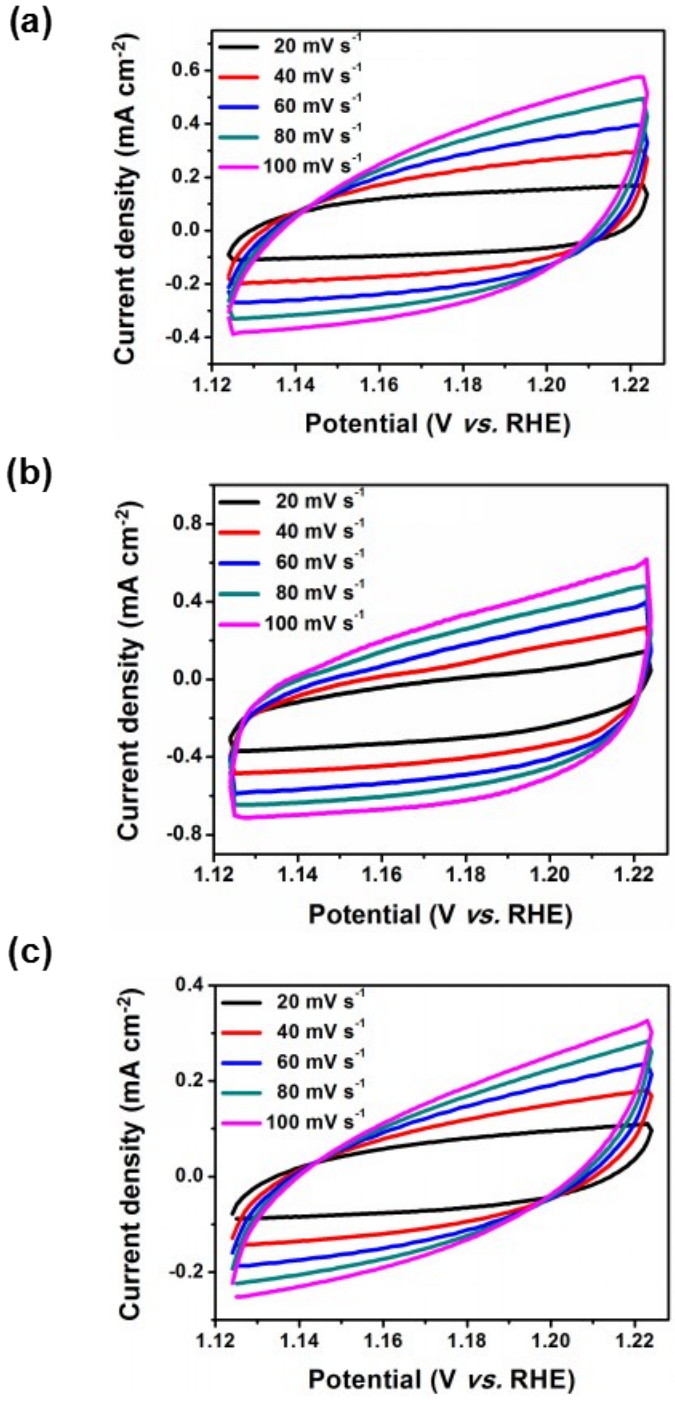

Fig. S7 Cyclic voltammograms (1.124–1.224 V *vs* RHE) of (a) $CoSe_2$-400, (b) $CoSe_2$-450, and (c) $CoSe_2$-550 recorded in 1.0 M KOH.

Table S2. Comparison of OER performance for $CoSe_2$-450 with other $CoSe_2$ OER electrocatalyst.

Electrocatalysts	Onset potential (V *vs*. RHE)	Overpotential (mV vs.RHE)	Tafel slope (mV/dec)	Refs.
$CoSe_2$-450	1.48	330	79	This work
Zn-doped $CoSe_2$/CFC	1.35	356	88	[S1]
NG-$CoSe_2$ nanobelt	1.52	370	40	[S2]
Mn_3O_4/$CoSe_2$ nanobelt	1.60	450	49	[S3]
ultrathin $CoSe_2$	1.49	320	44	[S4]
CoO/$CoSe_2$	1.55	337	137	[S5]

Supplementary References

[S1] Q. C. Dong, Q. Wang, Z. Y. Dai, H. J. Qiu and X. C. Dong, *ACS Appl. Mater. Interfaces,* 2016, **8**, 26902-26907.

[S2] M. Gao, X. Cao, Q. Gao, Y. Xu, Y. Zheng, J. Jiang and S. H. Yu, *ACS Nano,* 2014, **8**, 3970-3978.

[S3] M. Gao, Y. Xu, J. Jiang, Y. Zheng and S. H. Yu, *J. Am. Chem. Soc.,* 2012, **134**, 2930-2933.

[S4] Y. Liu, H. Cheng, M. Lyu, S. Fan, Q. Liu, W. Zhang, Y. Zhi, C. Wang, C. Xiao and S. Wei, *J. Am. Chem. Soc.,* 2014, **136**, 15670-15675.

[S5] K. D. Li, J. F. Zhang, R. Wu, Y. F. Yu and B. Zhang, *Adv. Sci.,* 2016, **3**, 1500426-1500433.