

## Electronic Supplementary Information (ESI) for

### **Ordered mesoporous Co<sub>3</sub>O<sub>4</sub> spinels as stable, bifunctional, noble metal-free oxygen electrocatalysts**

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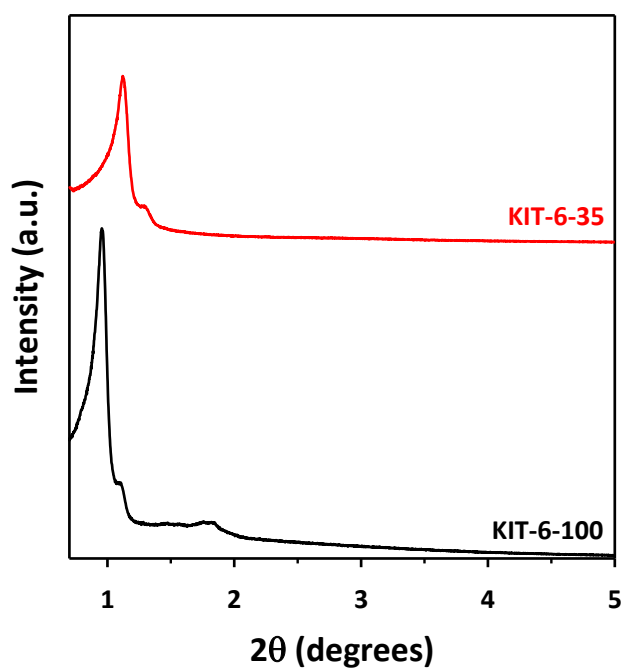
**Table. S1** Comparison of experimental conditions and OER activities of catalysts

Sample	BET surface area (m <sup>2</sup> g <sup>-1</sup> )	Catalyst loading (mg <sub>cat</sub> cm <sup>-2</sup> )	Electrolyte	Overpotential @ 10 mA cm <sup>-2</sup> (mV)	Tafel slope (mV dec <sup>-1</sup> )	Mass activity @ 1.6 V (A g <sub>cat</sub> <sup>-1</sup> )	Ref.
meso-Co <sub>3</sub> O <sub>4</sub> -35	135	0.10	0.1 M KOH	411	80	63	This work
meso-Co <sub>3</sub> O <sub>4</sub> -100	114	0.10	0.1 M KOH	426	66	53	This work
Co <sub>3</sub> O <sub>4</sub> NPs	58	0.10	0.1 M KOH	449	63	31	This work
Commercial Co <sub>3</sub> O <sub>4</sub>	N/A	0.10	0.1 M KOH	N/A	85	8	This work
20 wt% Pt/C	N/A	0.10 (0.02) <sup>a</sup>	0.1 M KOH	634	250	9.8 (49) <sup>a</sup>	This work
20 wt% Ir/C	N/A	0.10 (0.02) <sup>a</sup>	0.1 M KOH	409	126	71.2 (356) <sup>a</sup>	This work
CoO/CNT	170	0.05	1 M KOH	550	108	43	[1]
Mesoporous Co <sub>3</sub> O <sub>4</sub>	156	0.13	0.1 M KOH	525	N/A	22	[2]
6 nm Co <sub>3</sub> O <sub>4</sub> NPs	111	1.00	1 M KOH	328	~70	35	[3]

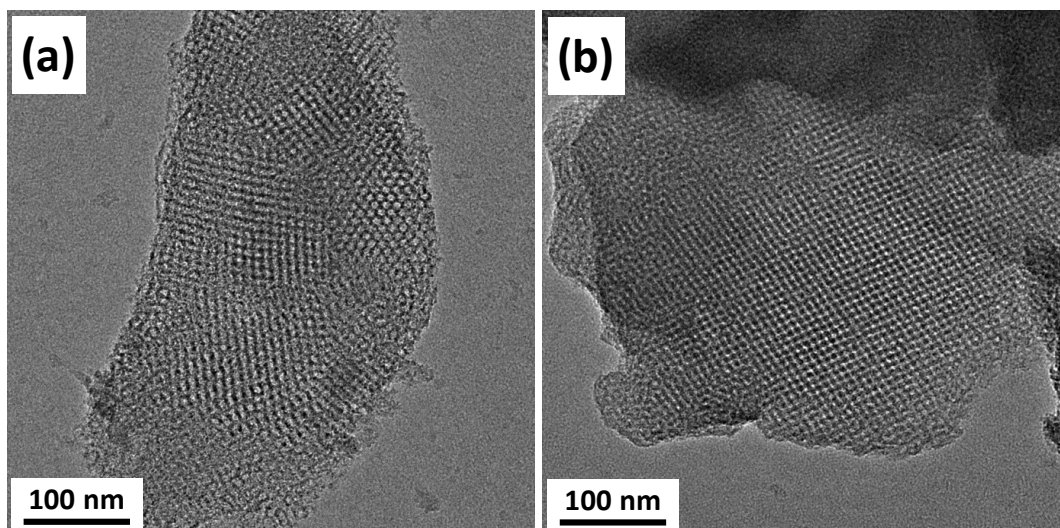
<sup>a</sup> Numbers in parenthesis are values normalized by weight of only metal (Pt or Ir).

### References for Table 1

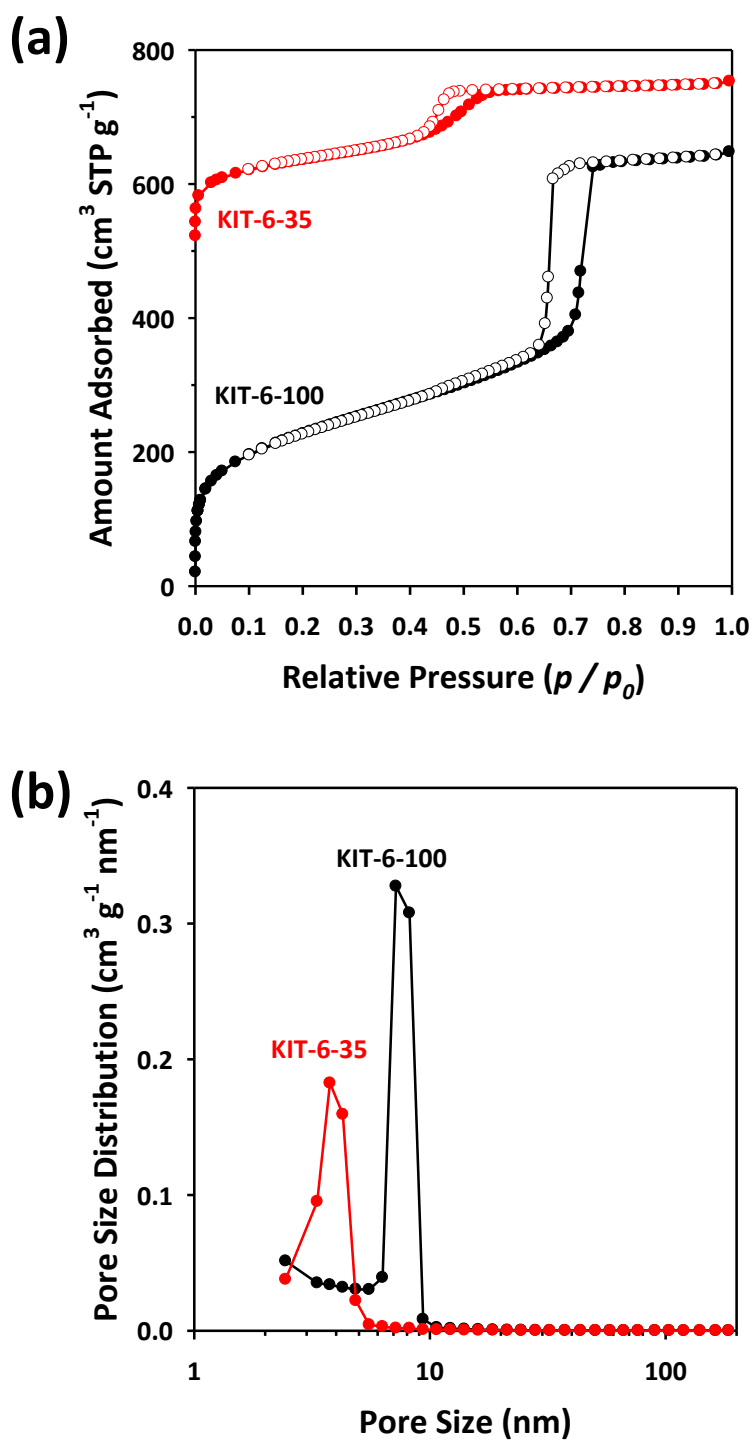
1. J. Wu, Y. Xue, X. Yan, W. Yan, Q. Cheng and Y. Xie, *Nano Res.*, 2012, **5**, 521–530.
2. H. Tüysüz, Y. J. Hwang, S. B. Khan, A. M. Asiri and P. Yang, *Nano Res.*, 2013, **6**, 47–54.
3. A. J. Esswein, M. J. McMurdo, P. N. Ross, A. T. Bell and T. D. Tilley, *J. Phys. Chem. C*, 2009, **113**, 15068–15072.



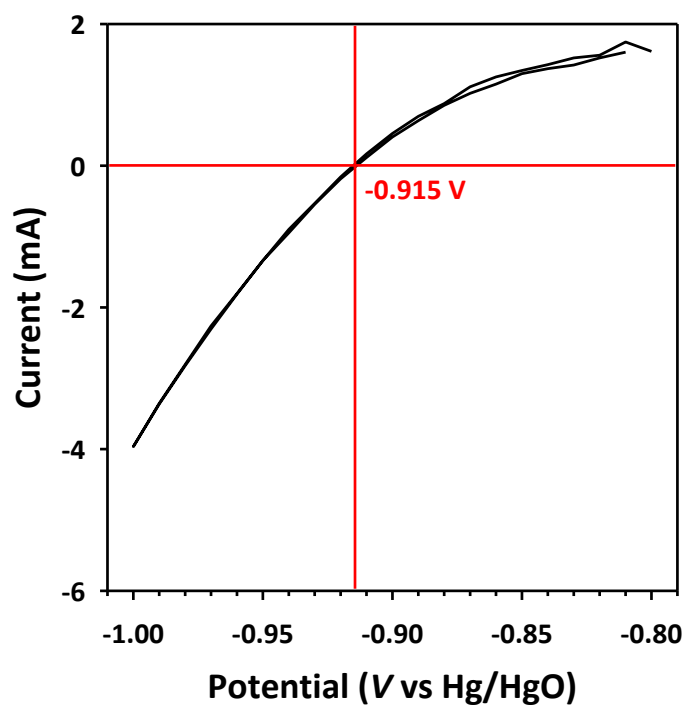
**Fig. S1** Low-angle XRD patterns for KIT-6 silica templates.



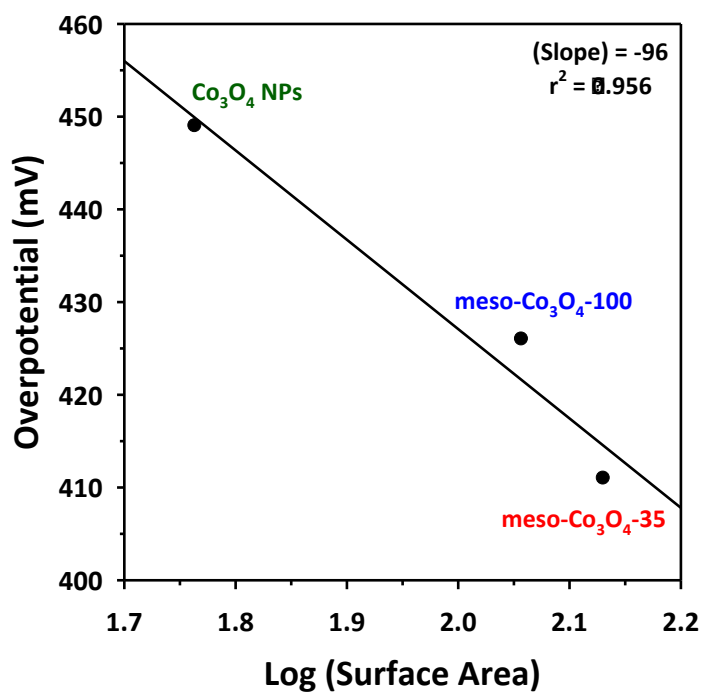
**Fig. S2** TEM images of (a) KIT-6-100 and (b) KIT-6-35 silica templates.



**Fig. S3** (a) Nitrogen adsorption-desorption isotherms for KIT-6 silica templates. The adsorption data for KIT-6-35 was offset vertically by 500 cm<sup>3</sup> g<sup>-1</sup>. (b) The corresponding pore size distribution curves from adsorption branches of the isotherms.



**Fig. S4** Plot showing the calibration of an Hg/HgO reference electrode conducted with respect to the RHE



**Fig. S5** Plot showing overpotentials for OER polarization at a current density of  $10 \text{ mA cm}^{-2}$  against the log of the BET surface areas of Co-based catalysts.