

## Electronic Supporting Information

# Nitrogen-Rich Porous Carbon Nanotubes Coated Co/Mo<sub>2</sub>N Composites Derived from Metal-Organic Framework as Efficient Bifunctional Oxygen Electrocatalysts

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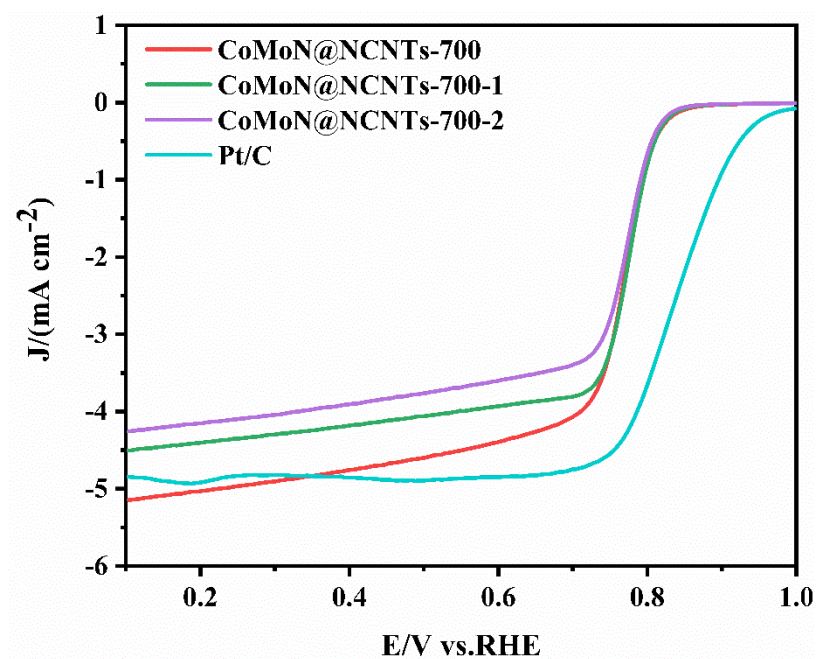
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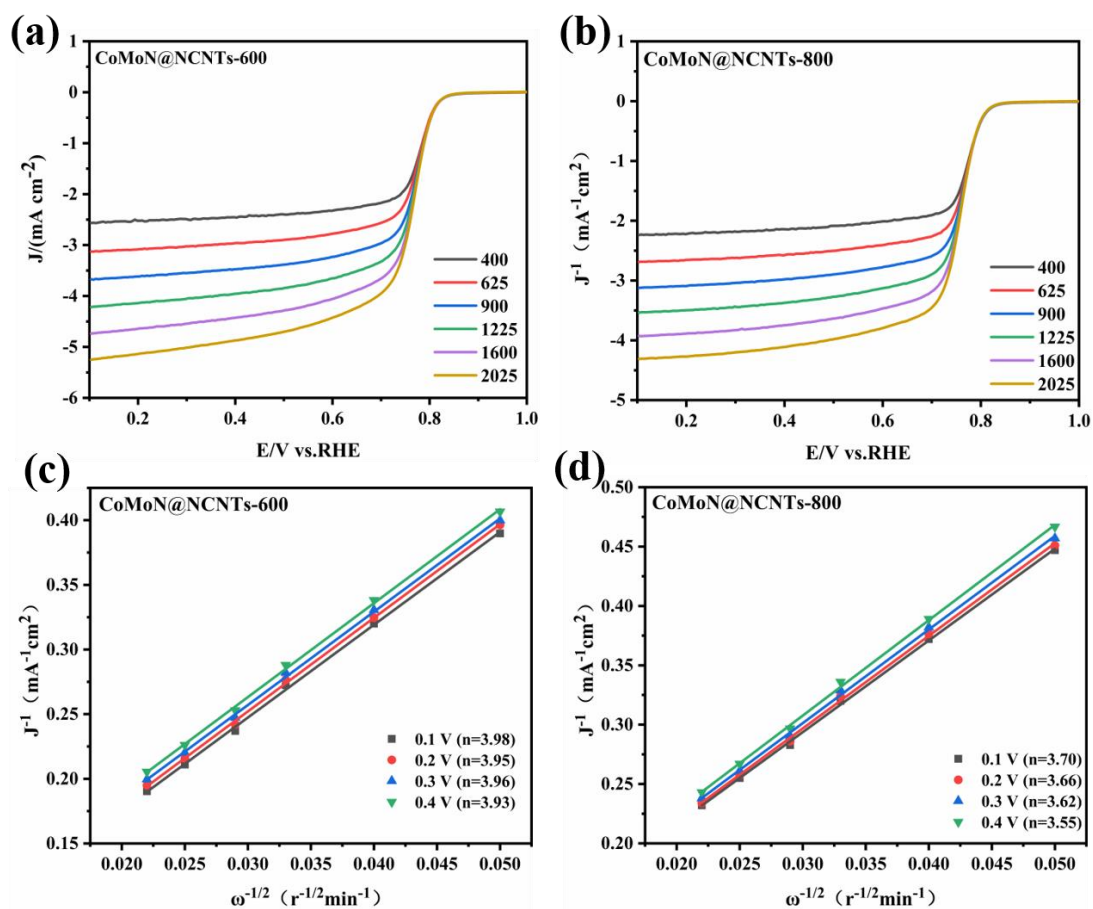
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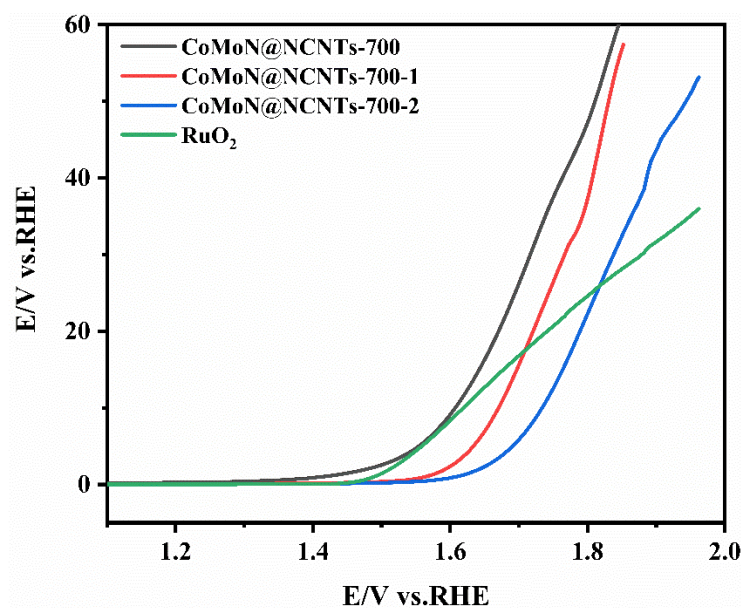


**Figure S1.** The LSV of series of prepared composites at rotating speed of 1600 rpm for ORR in 0.1 M KOH.

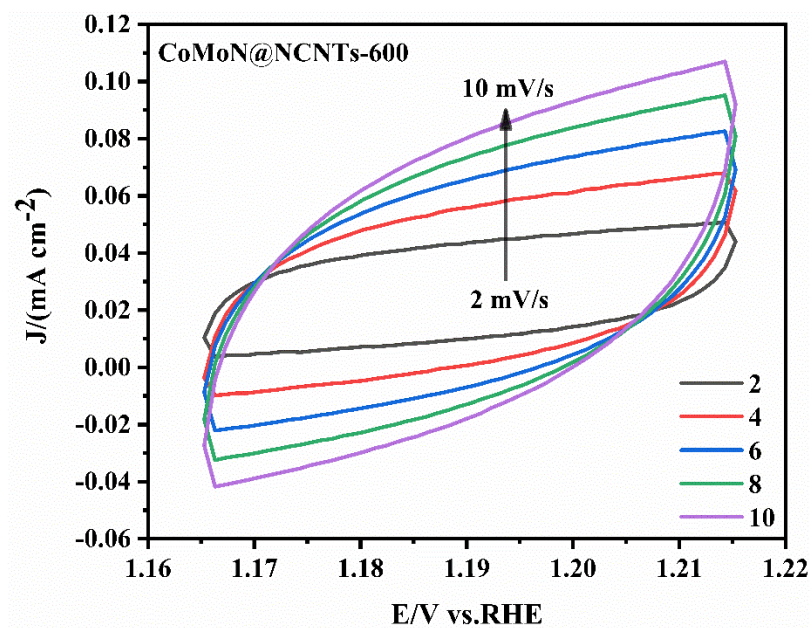


**Figure S2.** The LSV of (a) CoMoN@NCNTs-600 and (b) CoMoN@NCNTs-800 with the different rotating speed (400 to 2025 rpm) in 0.1 M KOH; K-L curves of (c)

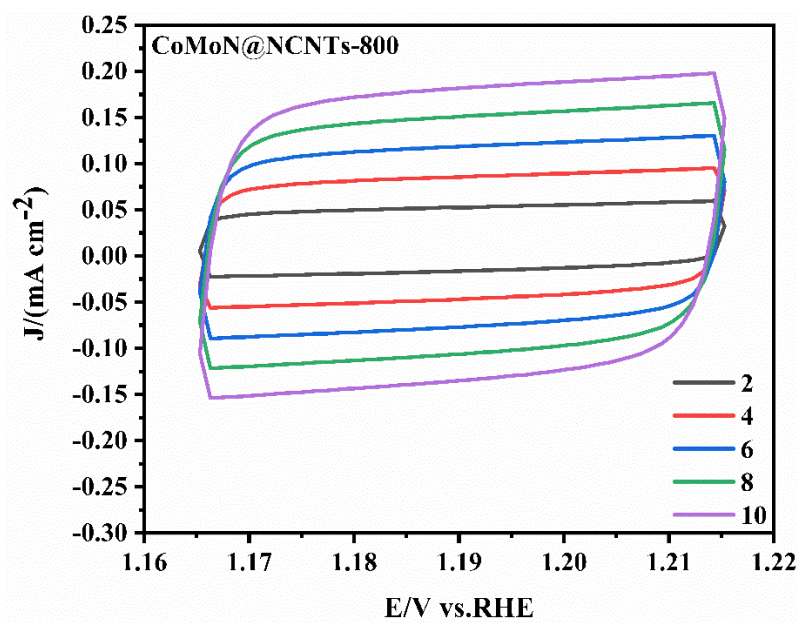
CoMoN@NCNTs-600 and (d) CoMoN@NCNTs-800.



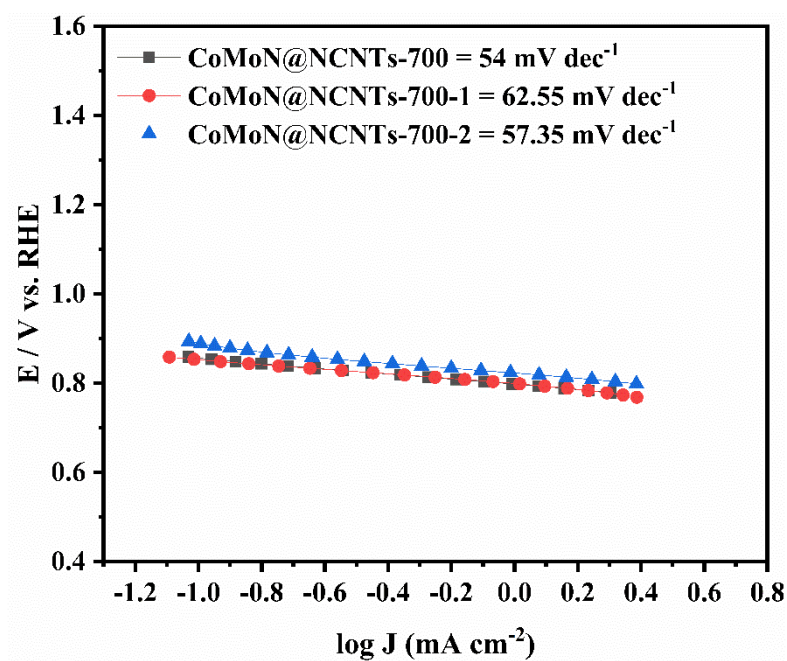
**Figure S3.** The LSV of series of prepared composites at rotating speed of 1600 rpm for OER in 0.1 M KOH.



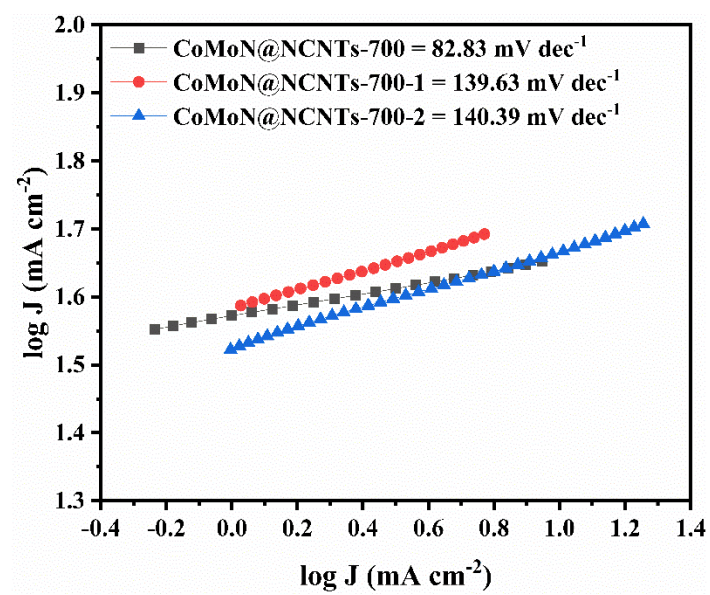
**Figure S4.** CV of CoMoN@NCNTs-600 measured at different scan rates from 2 to 10 mV s<sup>-1</sup>.



**Figure S5.** CV of CoMoN@NCNTs-800 measured at different scan rates from 2 to 10 mV s<sup>-1</sup>.



**Figure S6.** ORR Tafel of CoMoN@NCNTs-700, CoMoN@NCNTs-700-1 and CoMoN@NCNTs-700-2.



**Figure S7.** OER Tafel of CoMoN@NCNTs-700, CoMoN@NCNTs-700-1 and CoMoN@NCNTs-700-2.



**Table S1.** ORR, OER activities of previously reported bifunctional electrocatalysts at 1600 rpm.

Electrocatalysts	ORR			OER		OER-ORR	
	$E_{\text{ORR}, 1/2}$ (V)	$J$ (mA cm <sup>-2</sup> )	Tafel slope (mV dec <sup>-1</sup> )	$E_{\text{OER}, 10}$ (V)	Tafel slope (mV dec <sup>-1</sup> )	$\Delta E$	
CoMoN@NCNTs-700 (this work)	0.78	5.3	54	1.60	82.8	0.82	
CoMoN@NCNTs-600	0.75	4.7	63.2	1.78	140.2	1.03	
CoMoN@NCNTs-800	0.73	3.9	56.4	1.71	102.6	0.98	
TiO <sub>2</sub> C@CN <sub>x</sub>	0.75	5.0	-	1.50	-	0.75	Appl. Catal. B-Environ. 2019, 248, 366-379.
NCN-1000-5	0.82	6.4	86	1.64	142.0	0.82	Energy Environ. Sci. 2019, 12 (1), 322-333.
NB-CN	0.83	4.9	65	1.50	-	0.82	Nano Energy 2017, 42, 334-340.
Co <sub>2</sub> B/Co/N-B-C/B <sub>4</sub> C	0.83	4.9	63	1.54	111.0	0.71	ACS Appl. Mater. Interfaces 2018, 10 (43), 37067-37078.
PPy/FeTCPP/Co	0.86	5.5	65	1.61	61.0	0.75	Adv. Funct. Mater. 2017, 27 (17), 1606497.
Co/NGC	0.85	3.9	61	1.63	92.0	0.78	ACS Appl. Mater. Interfaces 2020, 12 (5), 5717-5729.
O-N-CN <sub>s</sub>	0.86	8.0	-	1.61	442.0	0.75	ACS Appl. Mater. Interfaces 2018, 10 (14), 11678-11688.
CoP-PBSCF	0.75	4.3	85.7	1.57	81.5	0.82	J. Mater. Chem. A 2019, 7 (46), 26607- 26617.
Co <sub>2</sub> Mn <sub>1</sub>	0.78	-	-	1.57	-	0.79	ACS Sustainable Chem. Eng. 2018, 6 (11), 14641-14651.
Co <sub>9</sub> S <sub>8</sub> @MoS <sub>2</sub>	-	-	-	1.57	94.0	-	ACS Appl. Mater. Interfaces 2018, 10 (2), 1678-1689.
Rh <sub>6</sub> Cu <sub>1</sub> /C	0.85	-	55	1.53	70.0	0.71	ACS Appl. Mater. Interfaces 2020, 12 (9), 10299-10306.
N-NiCo <sub>2</sub> O <sub>4</sub> @C	0.81	-	-	1.47	85.0	0.66	ACS Appl. Mater. Interfaces 2019, 11 (49), 45546-45553.

NCNT/CoFe-CoFe <sub>2</sub> O <sub>4</sub>	0.74	-	-	1.54	63.0	0.8	ACS Appl. Mater. Interfaces 2018, 10 (46), 39828-39838.
Cu-14-Co <sub>3</sub> Se <sub>4</sub> /GC	0.78	-	56	1.51	111.0	0.73	ACS Catal. 2019, 9 (12), 10761-10772.
Co <sub>9</sub> S <sub>8</sub> -MoS <sub>2</sub> /N-NAs@CNFs	0.82	5.3	-	1.57	84.0	0.75	ACS Appl. Mater. Interfaces 2020, 12 (9), 10280-10290.
ZnCo-PVP-900	0.83	5.3	52	1.65	-	0.82	ACS Appl. Mater. Interfaces 2019, 11 (10), 9925-9933.
Co <sub>9</sub> S <sub>8</sub> @Co <sub>9</sub> S <sub>8</sub> @MoS <sub>2</sub> -0.5	0.78	4.7	-	1.57	82.7	0.79	Inorg. Chem. Front. 2020, 7 (1), 191-197.
CoP@SNC	0.79	4.9	-	1.60	68.0	0.81	Nanoscale 2018, 10 (30), 14613-14626.
NiCoFe-LDH	0.63	-	-	1.57	-	0.94	Adv. Energy Mater. 2015, 5 (13) 1500245.
NiO/CoN Porous Nanowires	0.68	-	-	1.53	-	0.85	ACS Nano 2017, 11 (2), 2275-2283.
CoDNi-N/C	0.81	5.5	53	1.59	72	0.78	Appl. Catal. B-Environ. 2019, 240, 112-121.
CoNi(OH) <sub>x</sub>	-	-	-	1.51	77	-	Adv. Energy Mater. 2016, 6 (3) 1501661.