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# Engineering crystalline CoOOH anchored on N-doped carbon support as a durable electrocatalyst for oxygen reduction reaction

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**Materials Characterizations**

The X-ray diffraction (XRD) pattern was measured on a Rigaku D/Max-2550 V X-ray diffractometer with a Cu $K_\alpha$ radiation target (40 kV, 40 mA). Scanning electron microscope (SEM) imaging was performed using a Hitachi-S4800 scanning electron microscope (3.0 kV) and Magellan 400 field emission scanning electron microscope (30 kV). Transmission electron microscopic (TEM) imaging was conducted on a JEOL-2100F high resolution transmission electron microscope (200 kV). X-ray photoelectron spectroscopy (XPS) were recorded on a VG Micro MK II instrument using monochromatic Mg Kα X-rays (150 W, 1253.6 eV), and the C 1s electron peak (BE= 285 eV) was used as internal reference for spectrum calibration. A CHI 760E electrochemical workstation (CH Instruments) and the PINE instrument were used to evaluate the electrochemical properties of the samples.

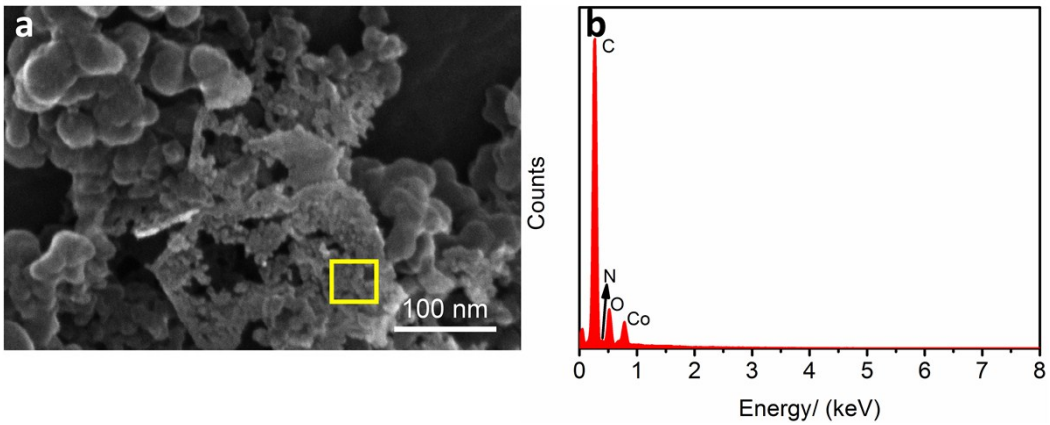


**Fig. S1** (a) SEM image of CoOOH@NC-175/300 and (b) corresponding EDX spectrum of the red rectangle area in (a).

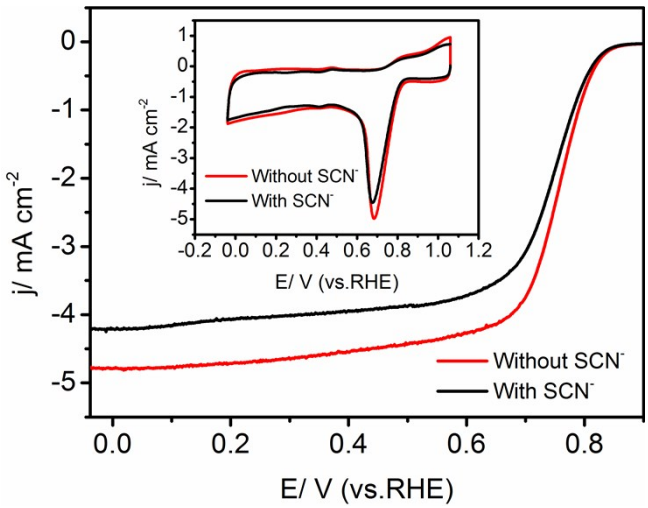


**Fig. S2** LSV curves and CV curves (inset) of CoOOH@NC-175/300 with and without addition of $SCN^-$ solution (0.1 M).

**Table S1.** Elemental composition of CoOOH@NC-175/300 from EDX analysis.

| Elements | C | O | N | Co |
|---|---|---|---|---|
| Atomic % | 88.72 | 6.24 | 1.07 | 3.97 |

**Table S2.** Elemental composition of CoOOH@NC-175/300 derived from XPS analysis

| Elements | C 1s | O 1s | N 1s | Co 2p |
|---|---|---|---|---|
| Atomic % | 87.87 | 6.53 | 2.99 | 2.6 |