

Supporting Information for:

**Nitrogen Doped Coal with High Electrocatalytic Activity for Oxygen Reduction
Reaction**

Chi Zhang,¹ Yunchao Xie,¹ Heng Deng,¹ Cheng Zhang,¹ Jheng-Wun Su,¹ and Jian Lin^{1*}

¹Department of Mechanical & Aerospace Engineering, University of Missouri, Columbia, Missouri 65211, United States.

Supplementary Figures

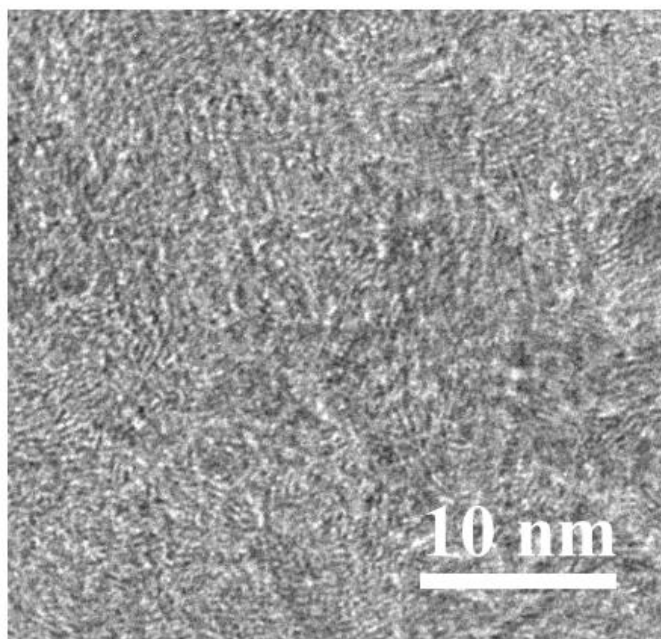


Figure S1. A HRTEM image of NOC.

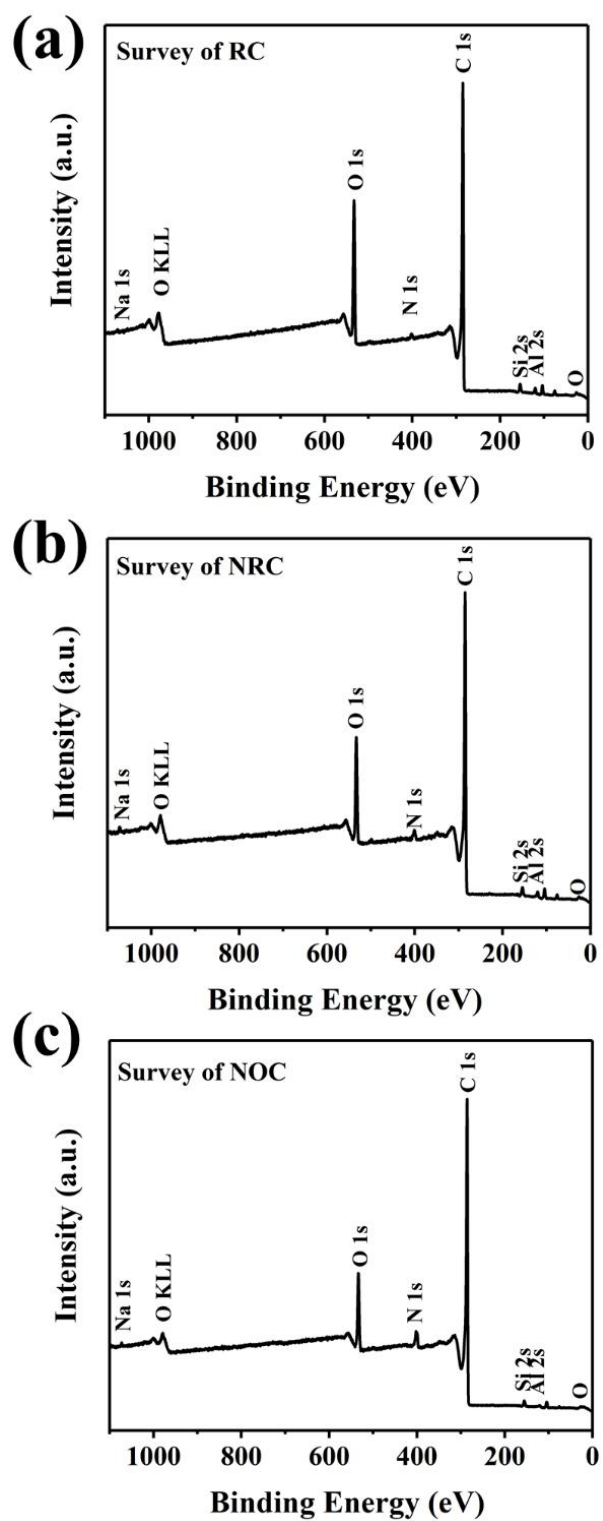


Figure S2. XPS surveys of raw coal (RC), nitrogen doped raw coal (NRC), and nitrogen doped oxidized coal (NOC).

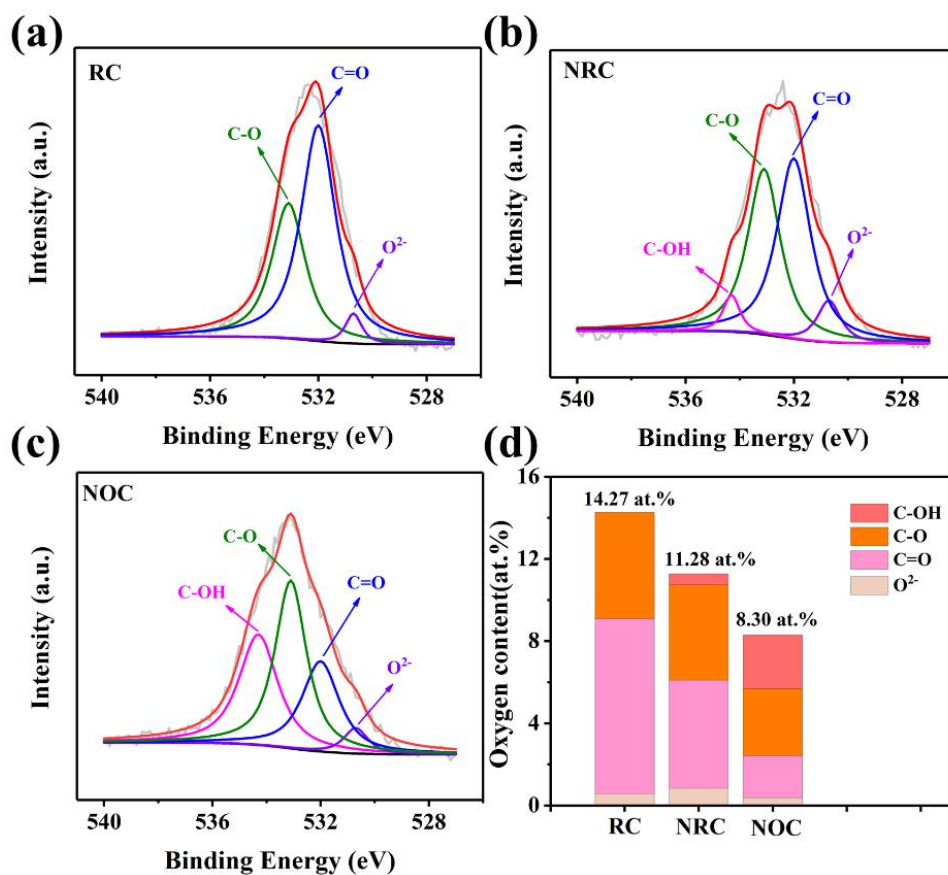


Figure S3. XPS O 1s spectra of (a) RC (b) NRC, and (c) NOC.

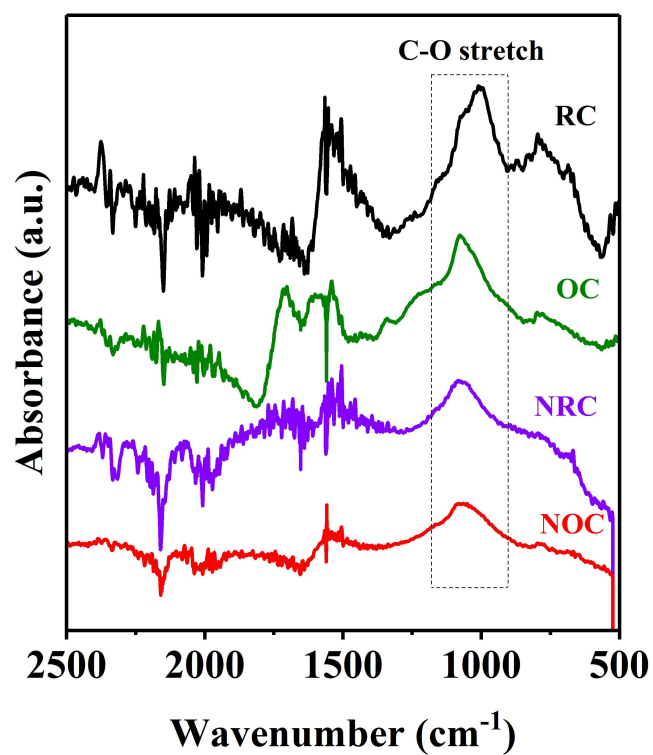


Figure S4. FTIR spectra of RC, OC, NRC and NOC.

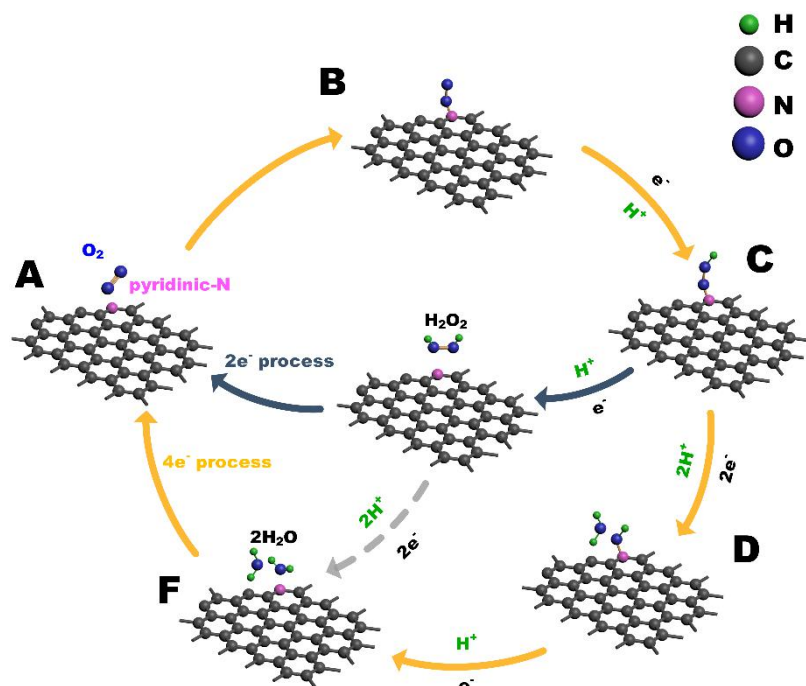


Figure S5. Possible reaction mechanism of NOC.

Table 1. N₂ adsorption–desorption measurements for the RC, NRC and NOC.

Sample	S _{BET} [m ² g ⁻¹]	V _{t-plot} [cm ³ g ⁻¹]	V _{BJH} [cm ³ g ⁻¹]
RC	26.510	0.0260	0.01673
NRC	63.584	0.0523	0.02669
NOC	153.26	0.3567	0.30674

Table 2. Relative concentrations of different oxygen and nitrogen contributions calculated from the XP O 1s and N 1s spectra, respectively.

Sample	O ²⁻ %	C=O %	C-O %	C-OH %	Pyridinic N%	Pyrrolic N%	Graphitic N%	Oxidized N%
RC	4.02	59.72	36.26	-	24.15	23.09	27.57	25.19
NRC	7.47	46.59	41.16	4.77	35.85	21.02	25.28	17.85
NOC	4.60	24.61	39.37	31.42	33.68	12.71	37.96	15.65