

## Supplementary information

### High performance electrochemical CO<sub>2</sub> reduction over Pd decorated cobalt containing nitrogen doped carbon

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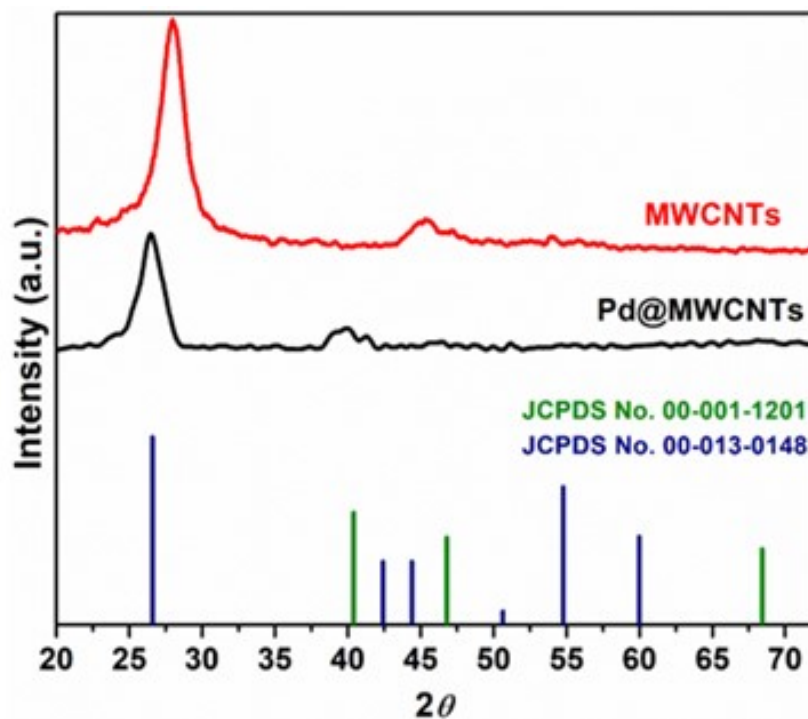


Figure S1. PXRD pattern of MWCNTs and Pd@MWCNTs

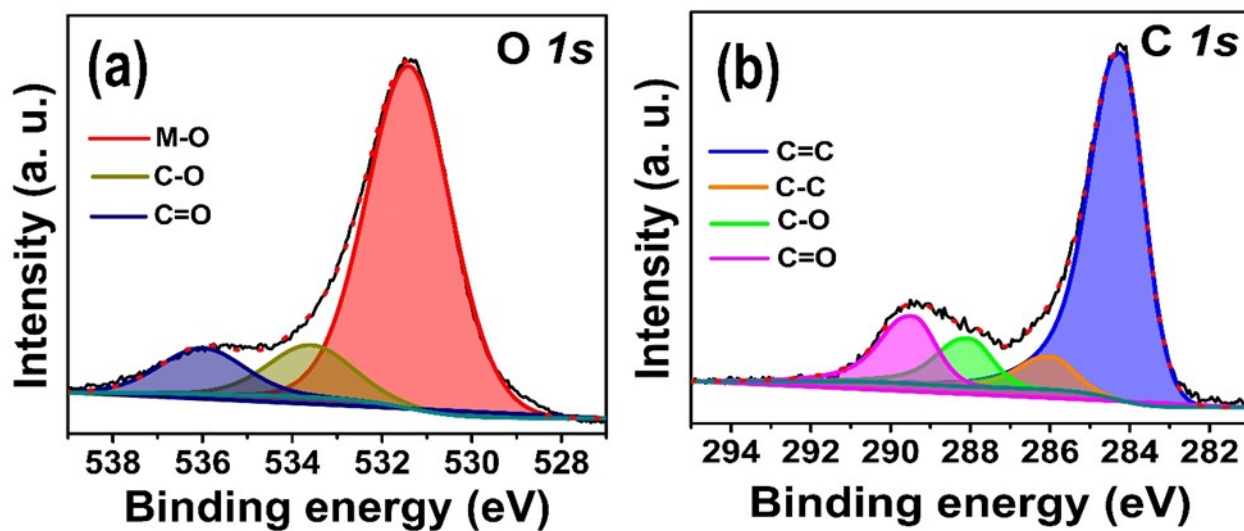


Figure S2. XPS spectrum of (a) O 1s and (b) C 1s

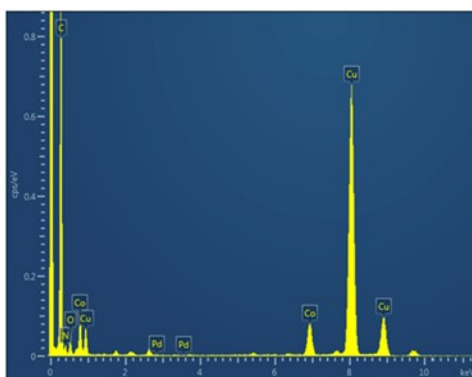


Figure S3. EDX analysis of Pd@CoO<sub>x</sub>/NC1

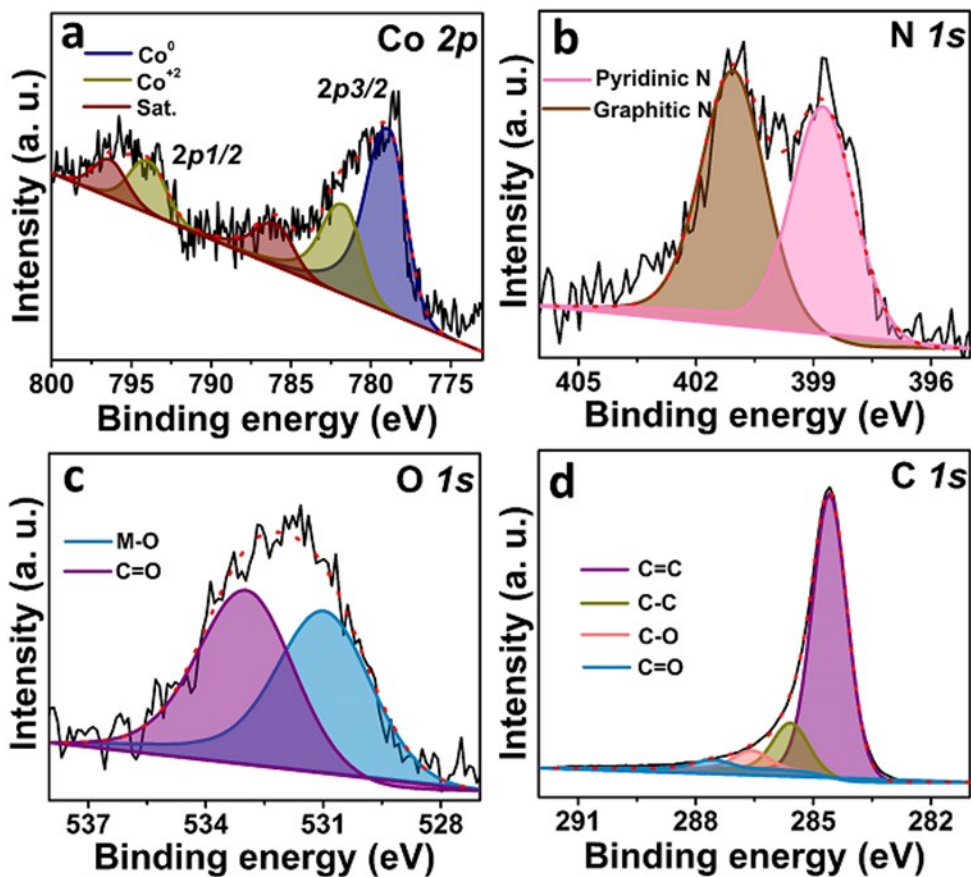


Figure S4. XPS spectrum of CoOx/NC (a) Co 2p (b) N 1s (c) O 1s (d) C 1s

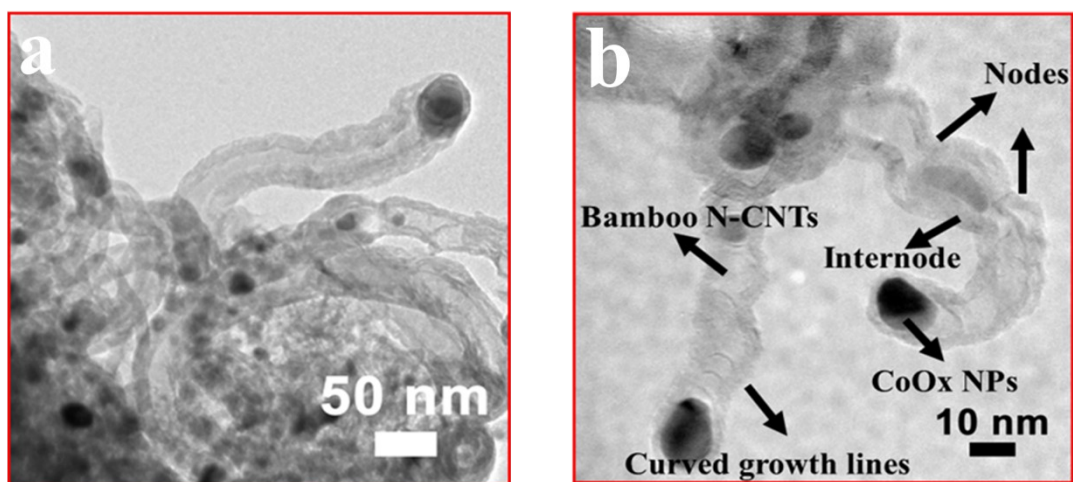
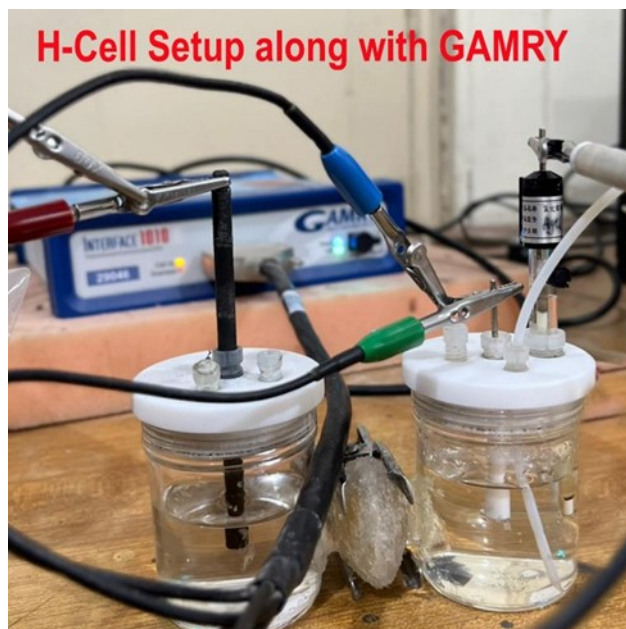


Figure S5. HRTEM image of CoOx/NC (a) 50 nm (b) 10 nm



**Figure S6.** H-cell setup along with GAMRY instrument used for the CO<sub>2</sub> reduction reaction



**Fig. S7.** Visible color change of PdCl<sub>2</sub> Strips: pre- and post-chemical reaction

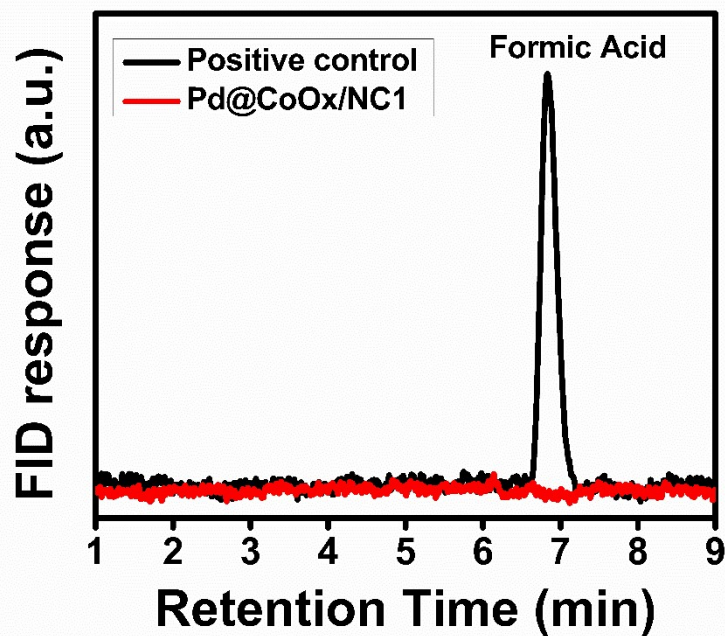


Fig.8. HS-GCFID chromatogram reveals no formic acid peak at 6.8 min Rt during catalytic activity, confirming Pd@CoOx/NC1 catalyst's CO selectivity.

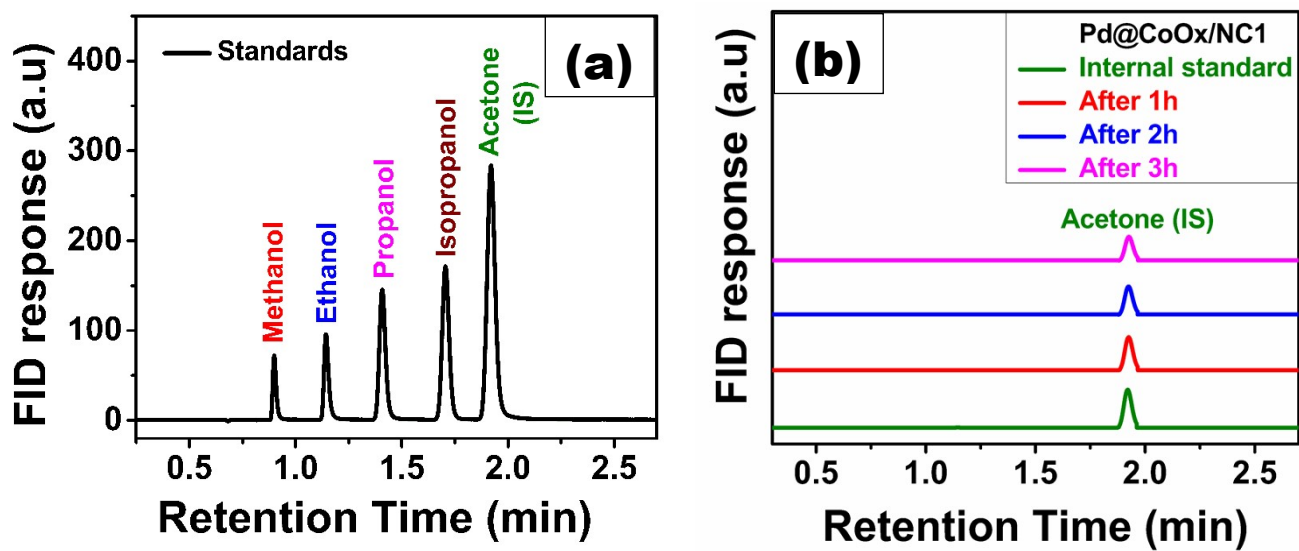


Fig. S9. HS-GCFID chromatogram (a) standards along with IS (b) Pd@CoOx/NC1 at different time durations.

**Table S1.** Powder XRD analysis of Pd@CoO<sub>x</sub>/NC1 electrocatalyst

<b>Miller indices (hkl)</b>	<b>2 Theta (deg)</b>	<b>cell parameter (a) nm</b>	<b>d-spacing (nm)</b>
111	39.60	0.39	0.2274
200	44.85	0.40	0.2019
220	68.10	0.39	0.1379