Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supplementary Information

Pyrolyzed cobalt hexacyanocobaltate dispersed on reduced-graphene-oxide as an electrocatalyst of the oxygen reduction reaction in an alkaline medium

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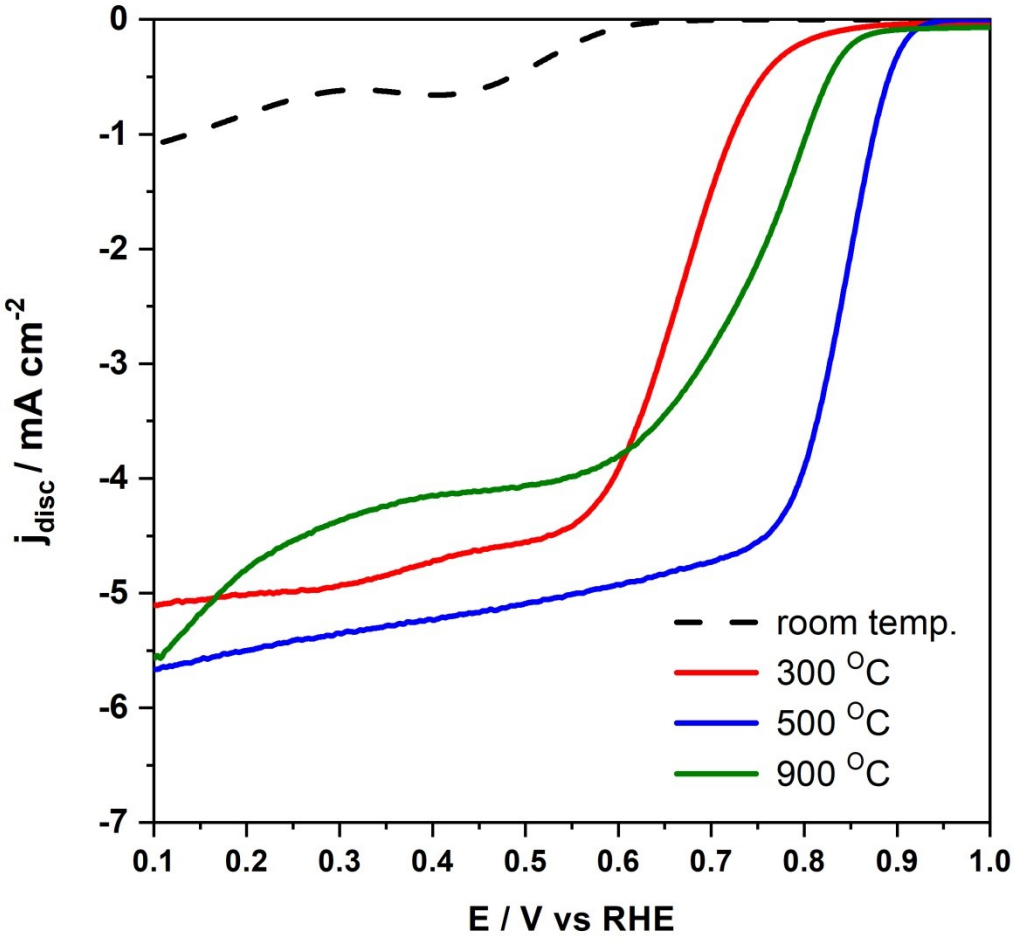

Figure S1. Current-potential RDE curves recorded in O_2-saturated 0.1 mol dm^{-3} KOH solution for materials derived by thermal treatment of CoHCNCo at various temperatures. Scan rate, 10 mV s^{-1}; rotation rate: 1600 rpm.

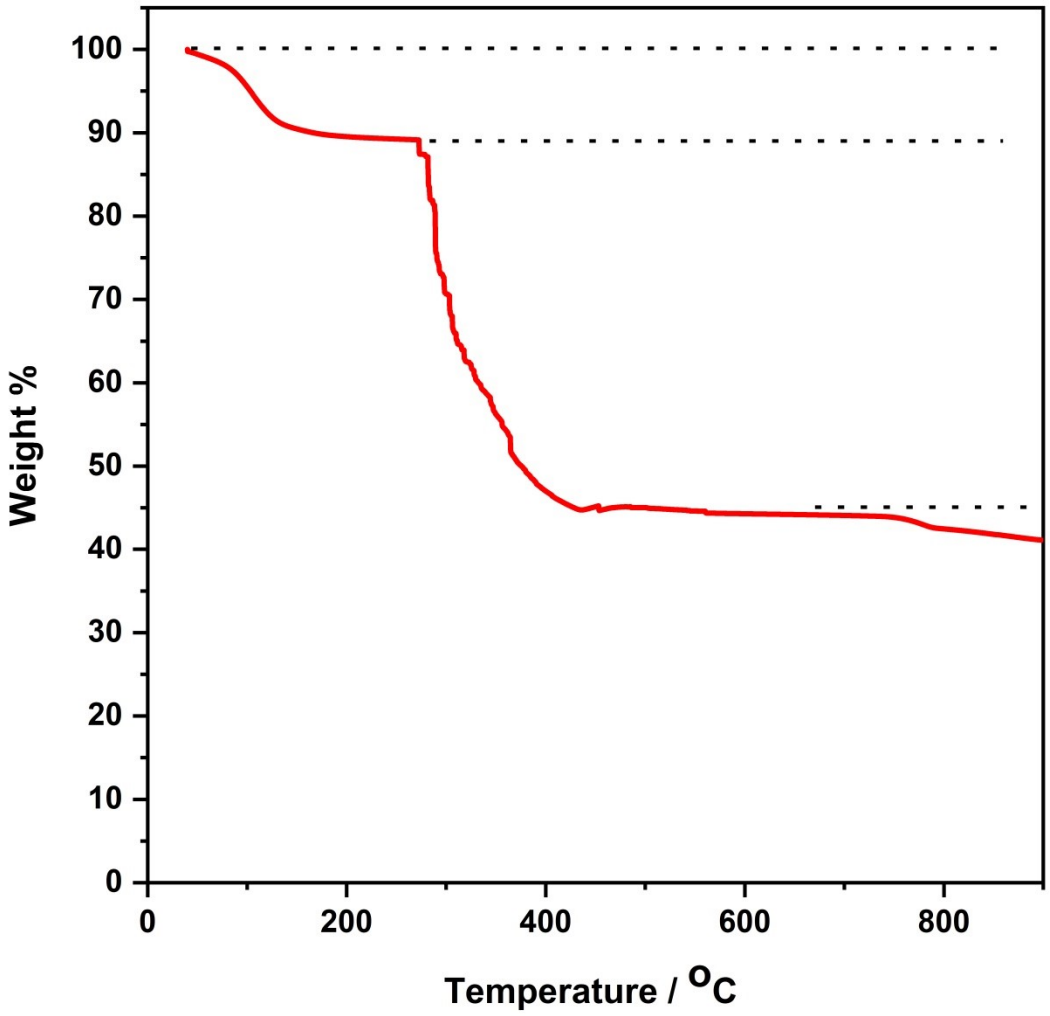

Figure S2. TGA profile of CoHCNCo.

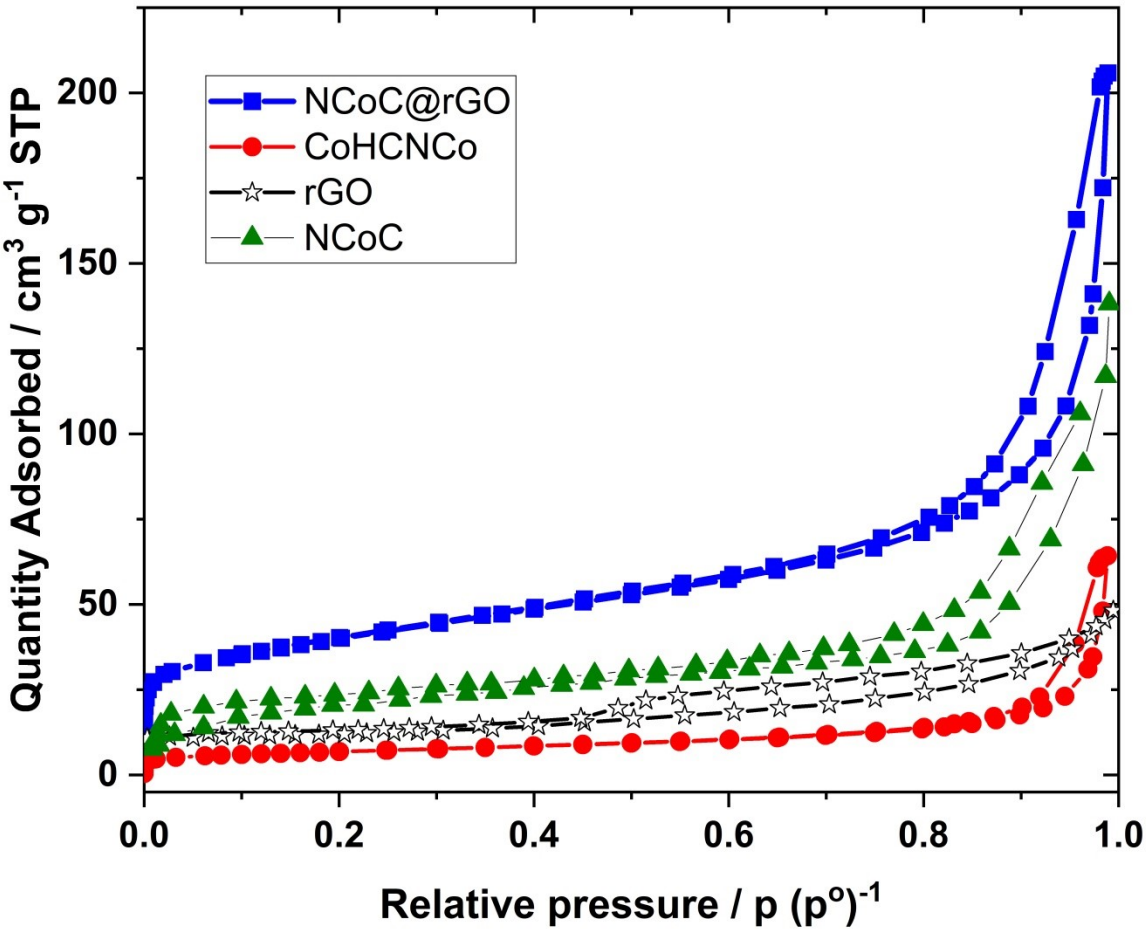

Figure S3. N_2 adsorption-desorption isotherms of CoHCNCo (red), rGO (black), NCoC thermally formed at 500 ^{O}C from CoHCNCo in the absence of rGO (green), and NCoC@rGO thermally formed at 500 ^{O}C from CoHCNCo@rGO (blue).

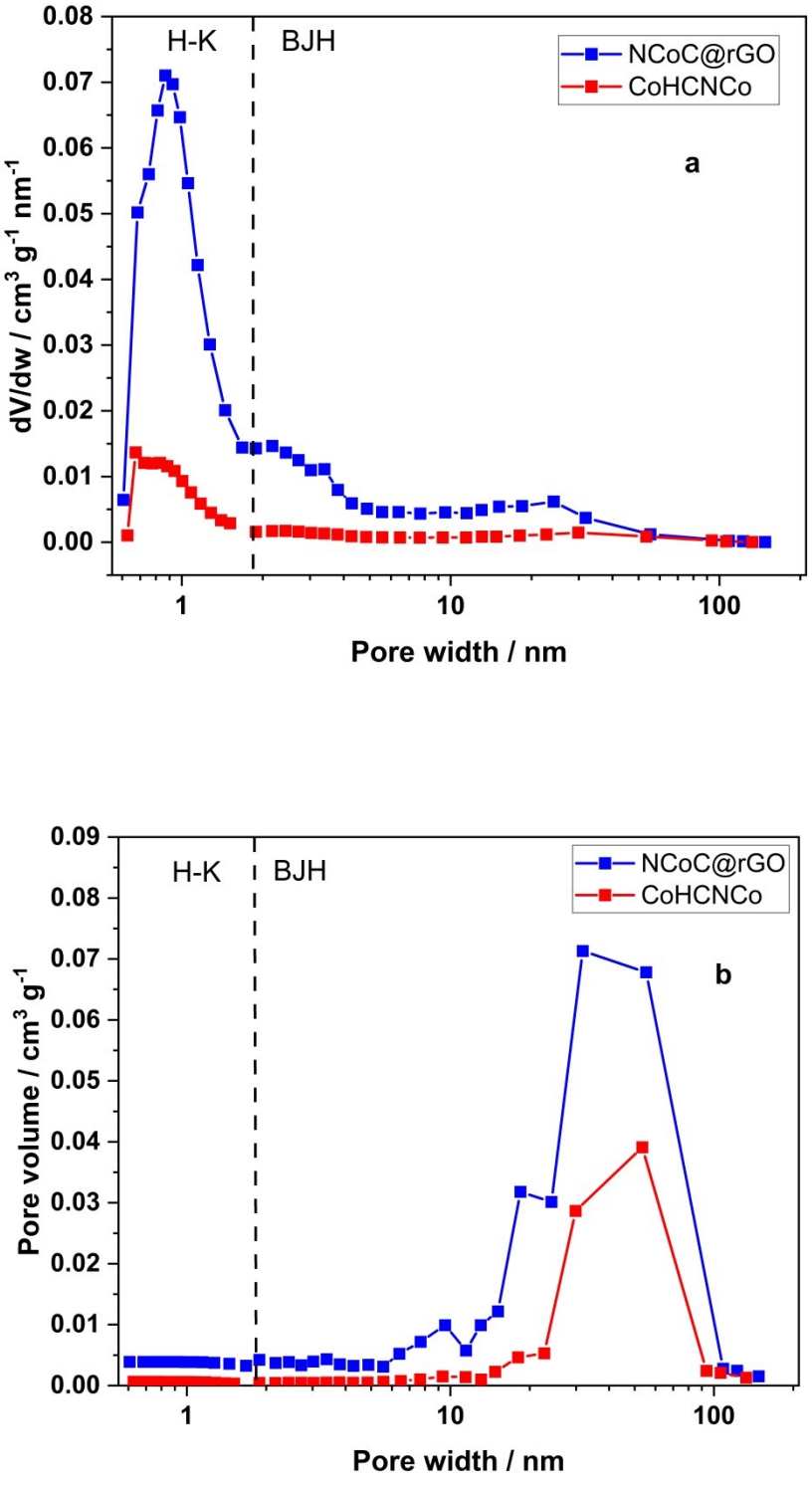

Figure S4. Pore size (a) and pore volumes (b) distributions for CoHCNCo (red curve) and NCoC@rGO formed by pyrolysis of CoHCNCo at 500 ^{O}C (blue curve).

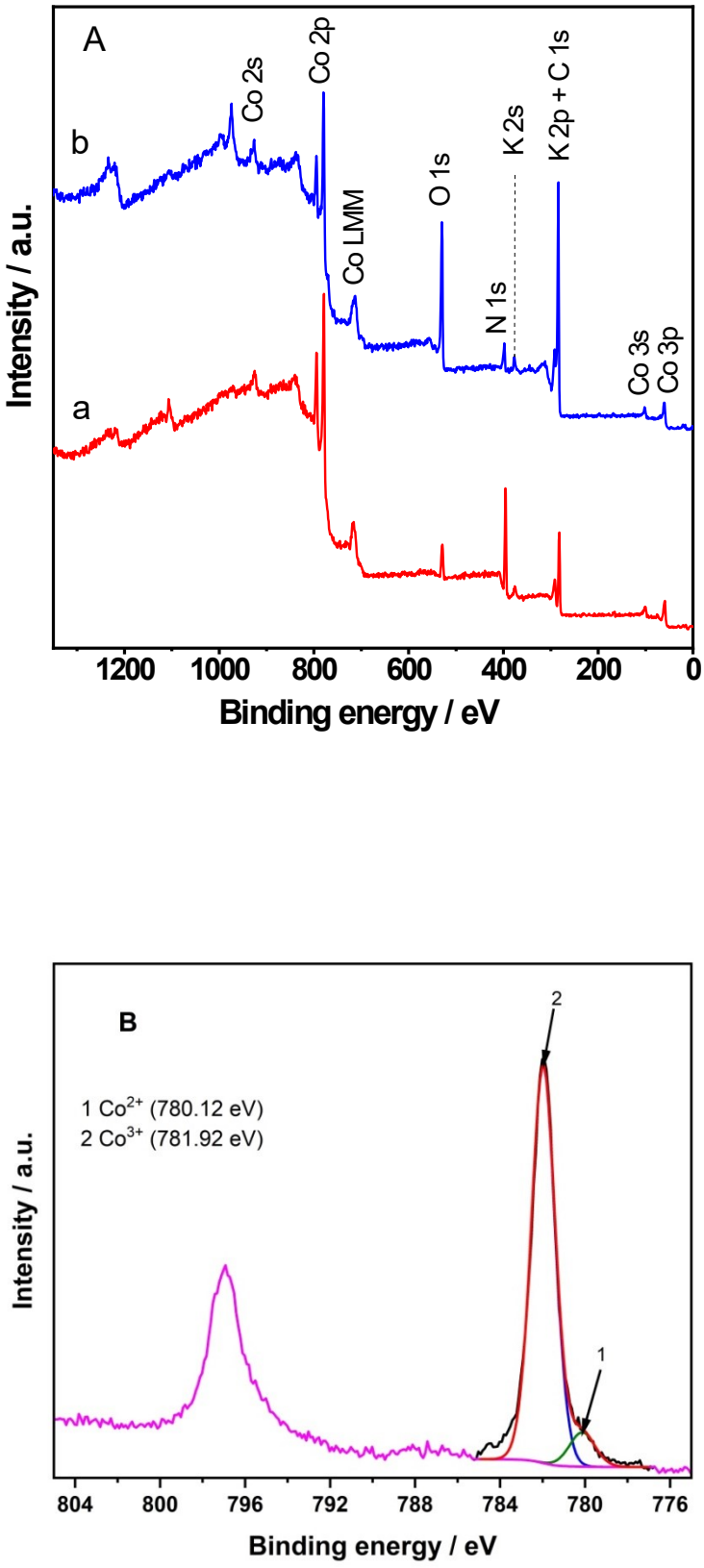

Figure S5. A) The overall XPS spectrum for CoHCNCo (red line) and NCoC@rGO (blue line). B) Co 2p spectral region of $K_3[Co(CN)_6]$.

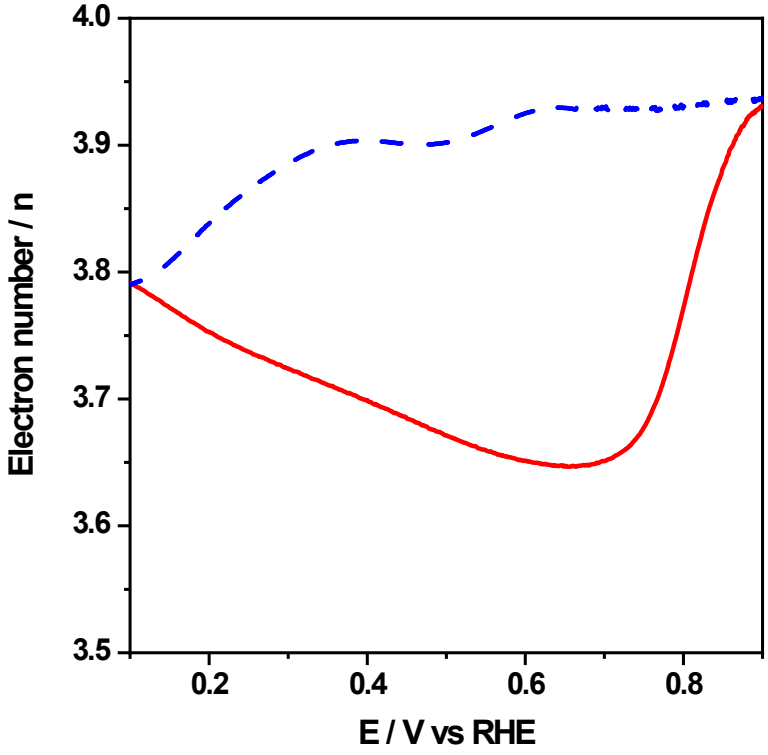

Figure S6 Number of transferred electrons (n) per oxygen molecule during the ORR at NCoC@rGO (solid line), and Pt/C nanoparticles (dashed line).

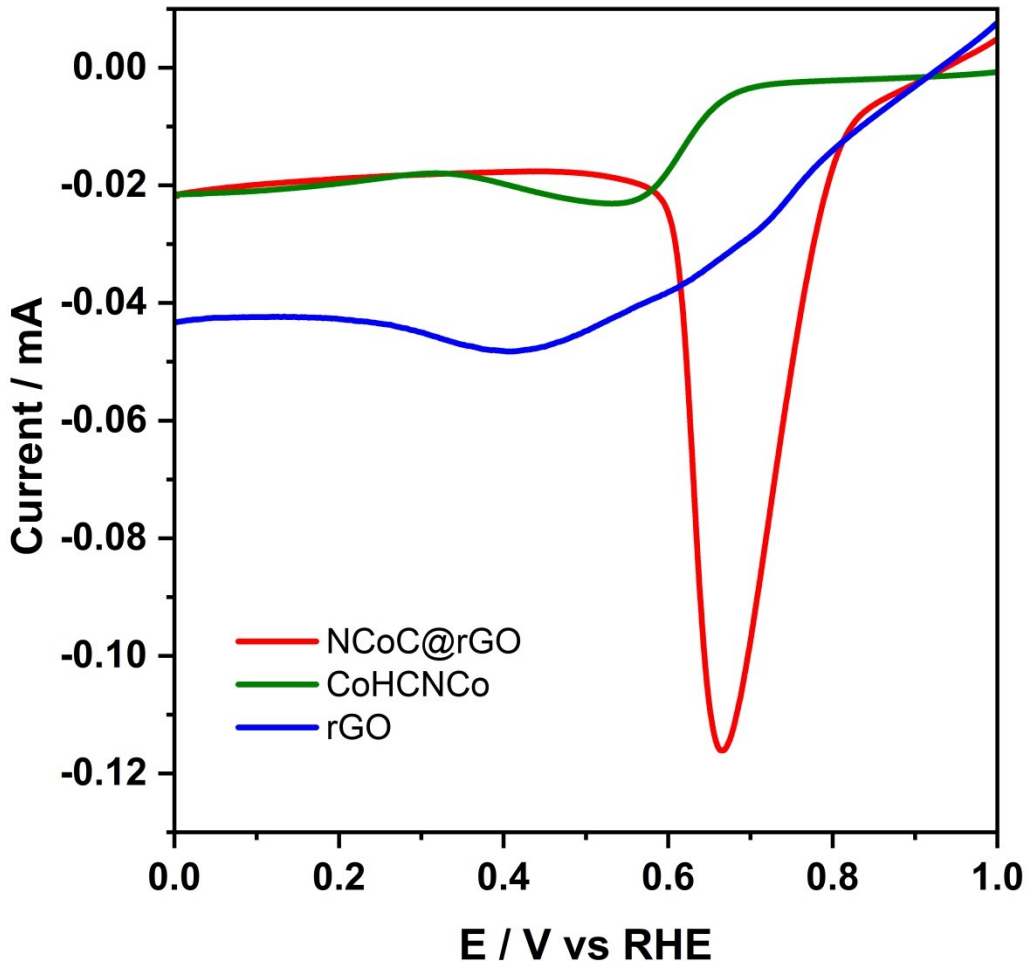

Figure S7. The LSV curves of rGO-, CoHCNCo- and NCoC@rGO-modified electrodes in 2 mmol dm^{-3} H_2O_2, 0.1 mol dm^{-3} KOH solution. Scan rate, 10 mV s^{-1}.

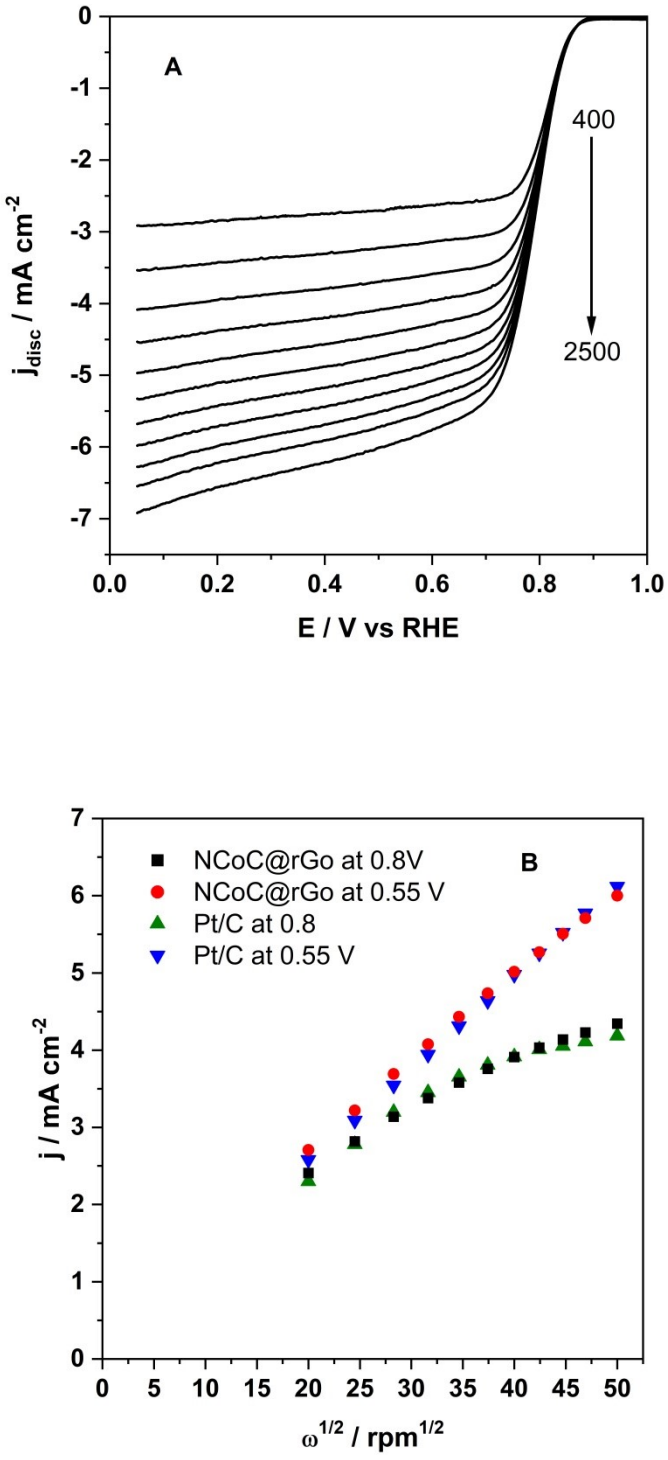

Figure S8. A) Linear scan voltammetry in O_2-saturated 0.1 mol dm^{-3} KOH at a NCoC@rGO-modified disk as a function of rotation rate in the range, 400 – 2500 rpm. Scan rate, 10 mV s^{-1}. B) Levich plots corresponding to Fig. S8A conditions for the ORR at NCoC@rGO and Pt/C.

Table S1. Comparison of the ORR performance for different catalysts.

Catalyst	Synthesis procedure	E_{onset} (V vs RHE)	$E_{1/2}$ (V vs RHE)	Number of electrons	Ref.
CoFe-NC/NC	Pyrolysis of CoFePBA at 800 ^{O}C	0.96	0,83	3.94-3.99	[1]
Co/C	pyrolysis of ZIF-67 at 900 °C	0.85	0.80	-	[2]
CdHCF	-	0.84	-	2.4	[3]
CoFe@NCS	Pyrolysis of CoHCNFe with ZIF-8 at 750 ^{O}C	-	0.83	3.7	[4]
CuHCF/f-CNT	Hydrothermal synthesis at 120 ^{O}C	0.79	0.63	3.6-.8	[5]
NCoC@rGO	Pyrolysis of CoHCNCo/rGO	0.92	0.83	3.7-3.8	In this work

References

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