



Supplementary Materials

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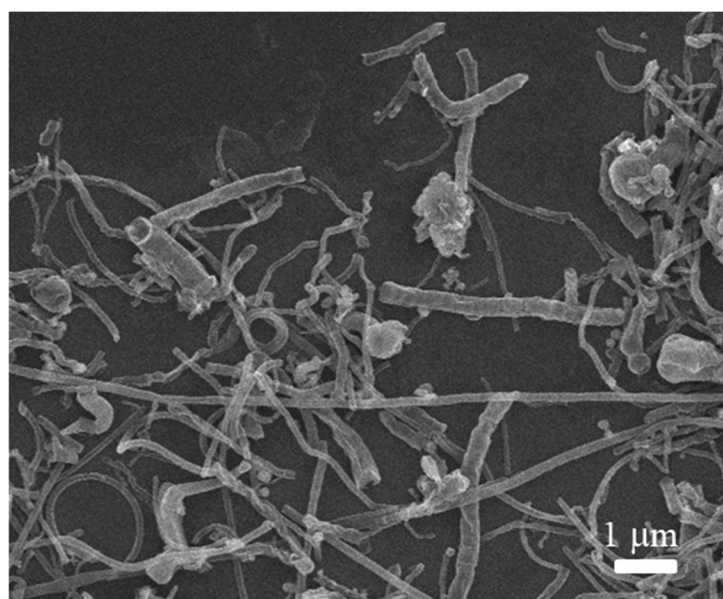


Figure S1. SEM image of NCNTs sample without Co nanoparticles.

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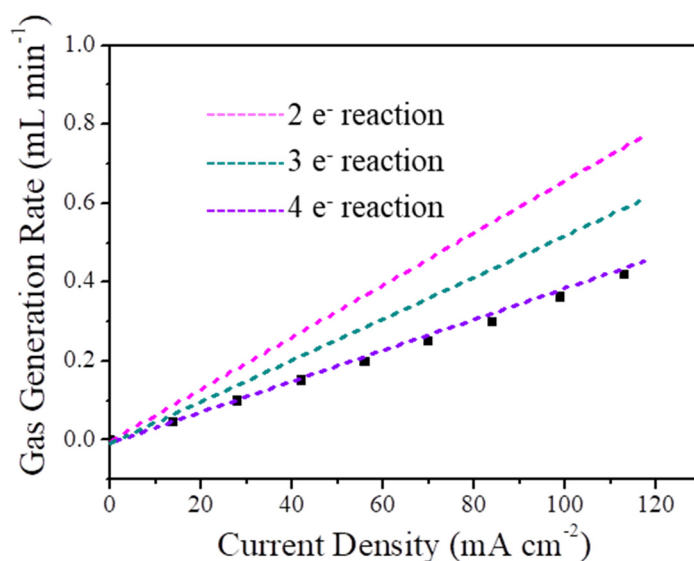


Figure S2. The variation of anodic gas generation rate as a function of current density obtained using Co@NCNTs-1 catalyst electrode.

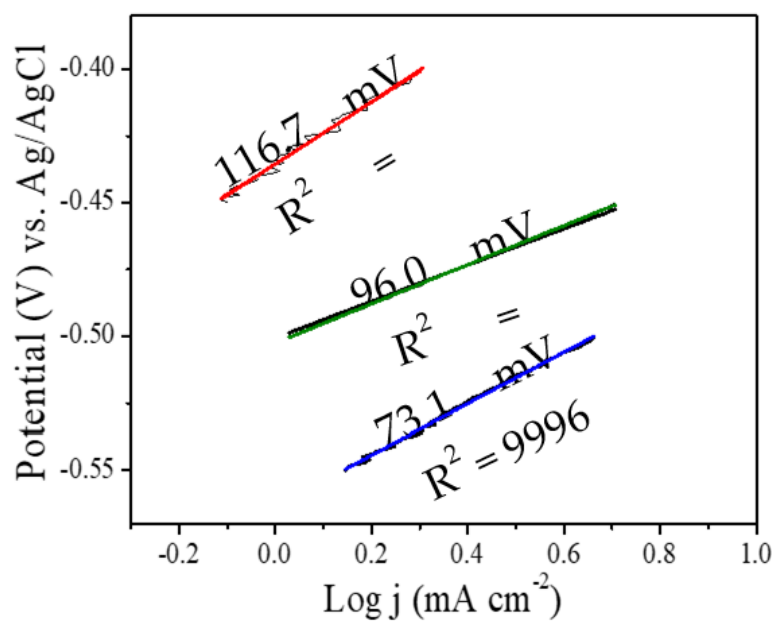


Figure S3. Tafel plots taken on a NCNTs (curve a), Co@NCNTs-2 (curve b), and Co@NCNTs-1 (curve c) catalyst samples modified GCE electrodes resulting from their respective LSV curves.

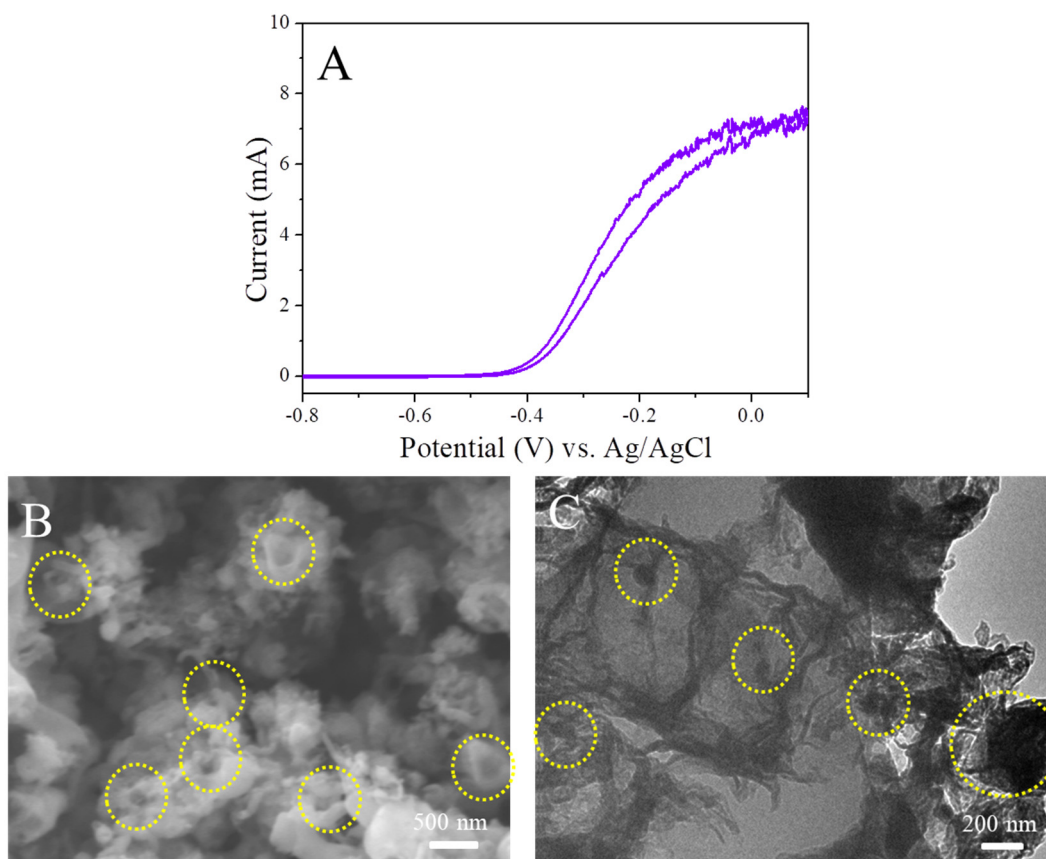


Figure S4. CV curve obtained for the extended chronoamperometry analysis using Co@NCNTs-1 catalyst electrode in 1.0 M NaOH solution containing 0.1 M hydrazine at a scan rate of 10 mV s⁻¹, and corresponding SEM (B), and TEM images (C) displaying the stability characterization using Co@NCNTs-1 catalyst electrode.

Table S1. Comparison of BET surface area of Co@NCNTs-1 with the results reported in the literature.

Scheme.	Name of the Nanomaterials	BET surface area/m ² g ⁻¹	References
1	Co@NCNTs-1	247.2	This Work
2	Fe/Fe ₃ C@NGL-NCNT	210	[1]
3	PL-bio-C	201.3	[2]
4	N-Fe/N/C-CNT	173.9	[3]
5	ZnCo ₂ O ₄ /N-CNT	159	[4]
6	MWCNT@S-N-C	121	[5]
7	Fe@C-NG/NCNTs	117.6	[6]

Table S2. Comparison of lower-onset oxidation potential obtained at Co@NCNTs-1 catalyst electrode with recently published metal/carbon catalysts based nanomaterials.

Scheme.	Name of the Nanomaterials	Onset Oxidation Potential (V)	References
1	NiO-NWs@N-HCNSs/GCE	+0.05	[7]
2	P-CuNi ₂ /C	-0.55	[8]
3	h-MnFe ₂ O ₄ NPs/N-rGO	-0.20	[9]
4	Fe@Cu-P/C	-0.15	[10]
5	PR/NiFe ₂ O ₄	+0.50	[11]
6	Co@NCNTs	-0.58	This Work

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