Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Cobalt Oxide Nanoparticles Decorated Reduced Graphene oxide (Co3O4-rGO): Active and Sustainable Nanoelectrodes for Water Oxidation Reaction

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Supporting Information

Fig.S-1: Energy Dispersive Analysis of X-ray (EDAX) in detail Spectra

Fig.S-2: X-ray Photoelectron Spectroscopy (XPS) of Co_3O_4-rGO

Fig.S-3: Electrochemistry

Fig.S-4: pH Dependent Studies:

Fig.S-5: Equivalence circuit and value Co_3O_4-rGO:

Fig.S-6: Morphological Stability analysis using Transmission Electron Microscopy (TEM) after electrocatalytic studies of Co_3O_4-rGO and Calculation for Enhancement Factor

Fig.S-1: Energy Dispersive Analysis of X-ray (EDAX) in detail Spectra

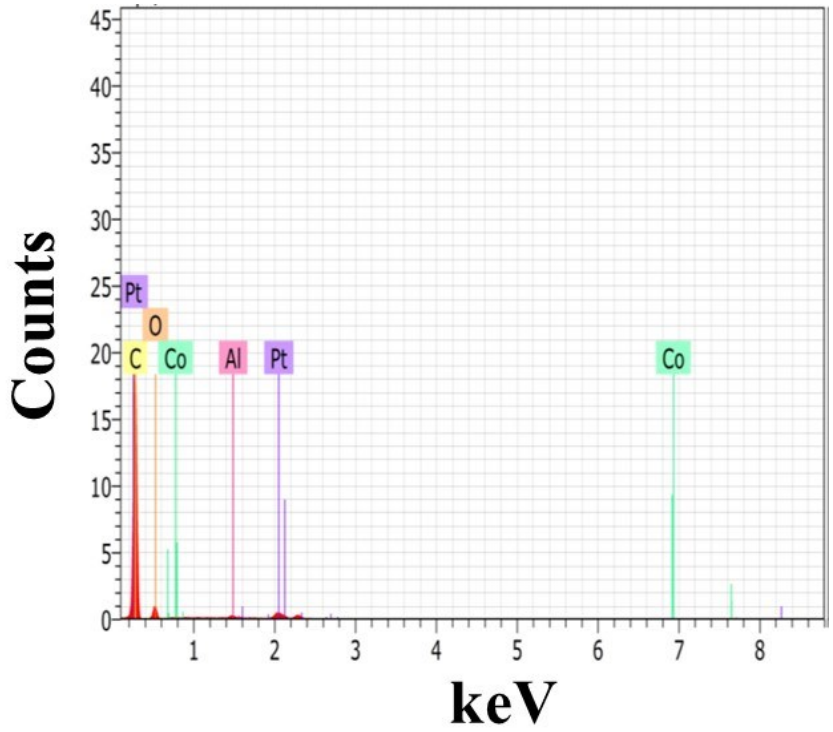


Fig.S-1 : Indicate the energy dispersive analysis of (EDAX) spectra of Co_3O_4@rGO are clearly indicate Co(2%), O (14%) and C (84%) element.

Fig.S-2: X-ray Photoelectron Spectroscopy (XPS) of Co_3O_4-rGO

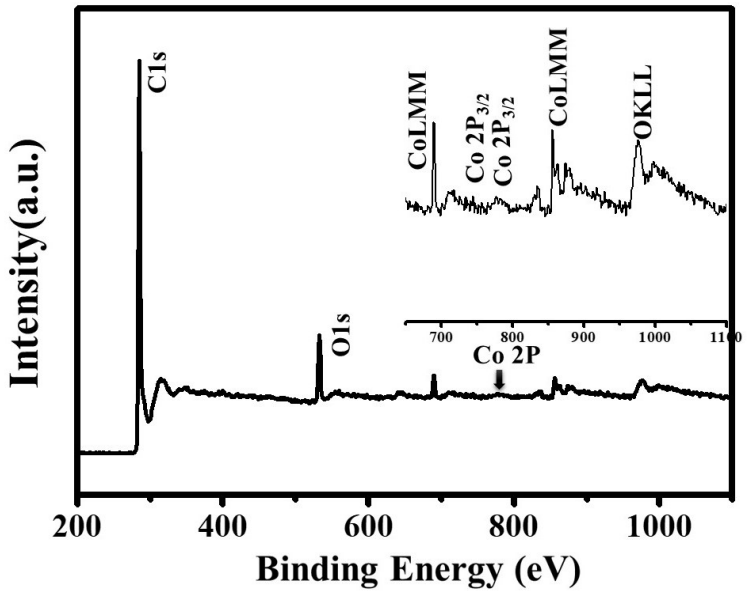


Fig. S-2 XPS full Survy of Co_3O_4@rGO

Fig.S-3: Electrochemistry:

Fig.S-3: i Water oxidation reaction

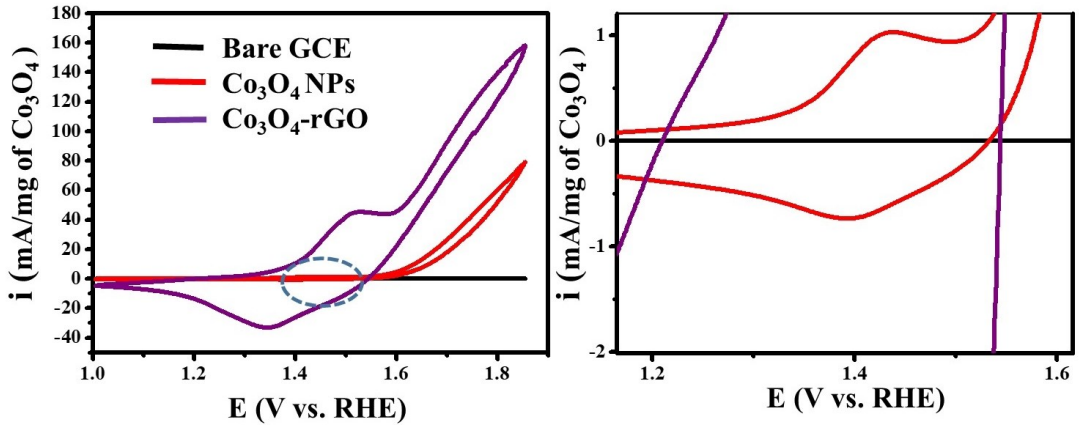


Fig. 3 i : Superimposed (a) cyclic voltammogram of bare GC (black), Co_3O_4-NPs (red) and Co_3O_4-rGO (purple) electrodes in 0.5 M KOH at 50 mV/s.

Fig.S-3: ii Scan rate Dependent Study:

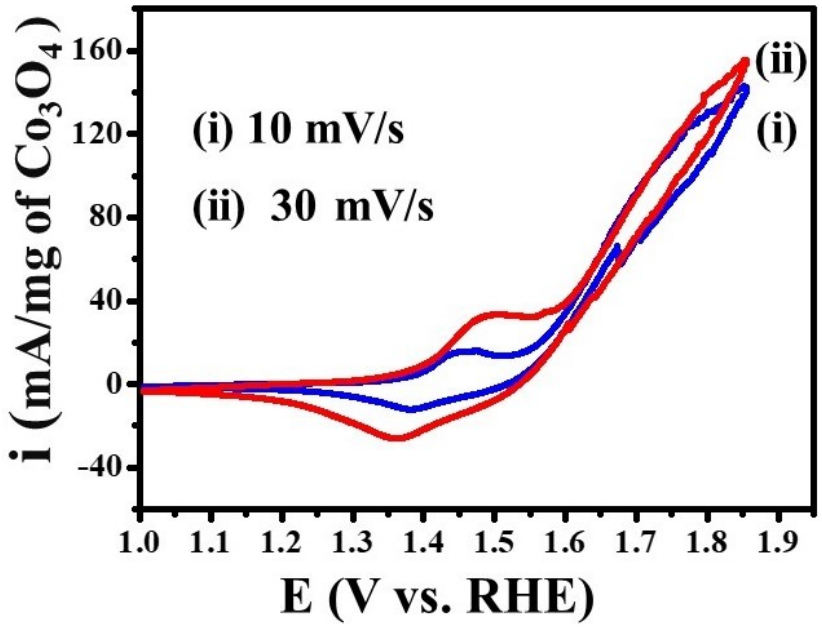


Fig S-3 ii : Superimposed scan rate dependent of cyclic voltammogram of Co_3O_4-rGO in 0.5 M KOH using Pt and SCE counter and reference electrodes respectively at different scan rates from (i) 10 , and (ii) 30 mV/s.

Fig.S-4: pH Dependent Studies:

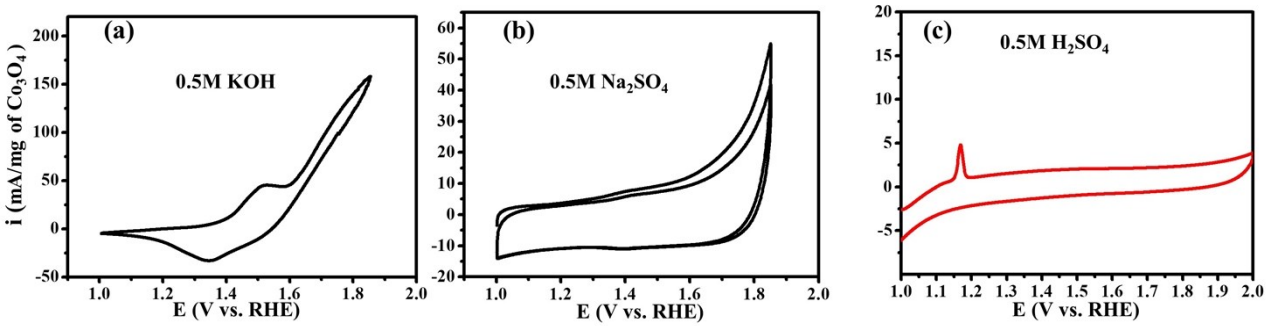
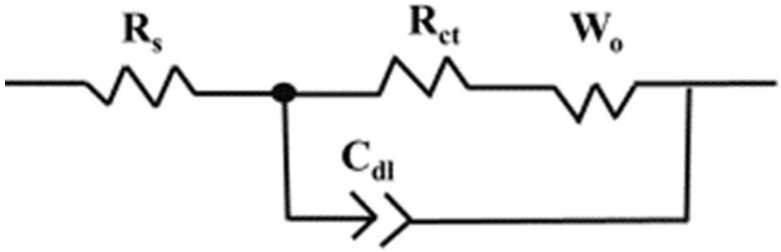


Fig. S: 4 Morphological Stability analysis using Transmission Electron Microscopy (TEM) after electrocatalytic studies of Co_3O_4-rGO

Fig.S-5: Equivalence circuit and value Co_3O_4-rGO:



Parameter	Value
R_s (Ω cm^{-2})	26
R_{ct} (Ω cm^{-2})	240
C_{dl} X 10^{-4} (F cm^{-2})	10

Fig.S-6: Morphological Stability analysis using Transmission Electron Microscopy (TEM) after electrocatalytic studies of Co_3O_4-rGO

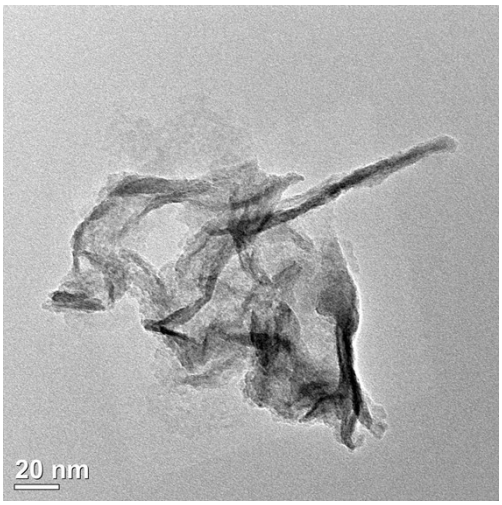


Fig.S- 6:-TEM image of Co_3O_4@rGO after chronoamphorometric studies.

Fig.S-6 shows TEM image of the Co_3O_4@rGO electrocatalyst after chronoamphorometric studies, confirms the morphological stability of the Co_3O_4 NPs on rGO and these findindings confirms the exceptionally higher stability of proposed systems.

Calculation for Enhancement Factor[1]:

Enhancement Factor = Current density of Electrocatalyst /bare Electrode* 100

References

[1] B.R. Sathe, B.K. Balan, V.K. Pillai, Energy Environ. Sci. 4 (2011) 1029.