Supporting information

Self-supported beaded Au@Co_3O_4 nanowire arrays electrocatalytic CO_2 in water to syngas and water oxidation to O_2

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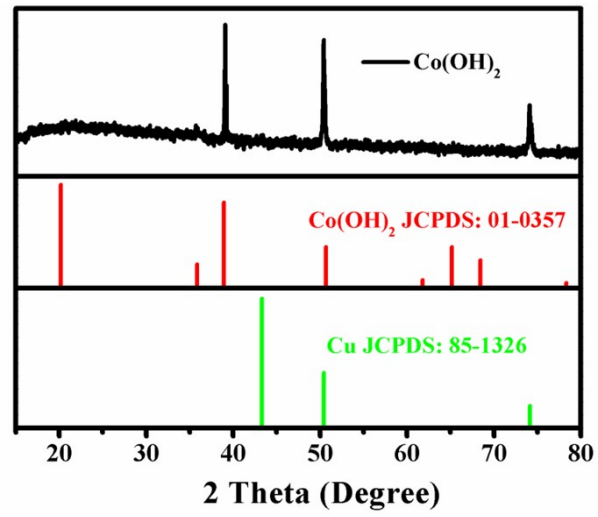


Figure S1 PXRD pattern of $Co(OH)_2$ NAs on Cu foam.

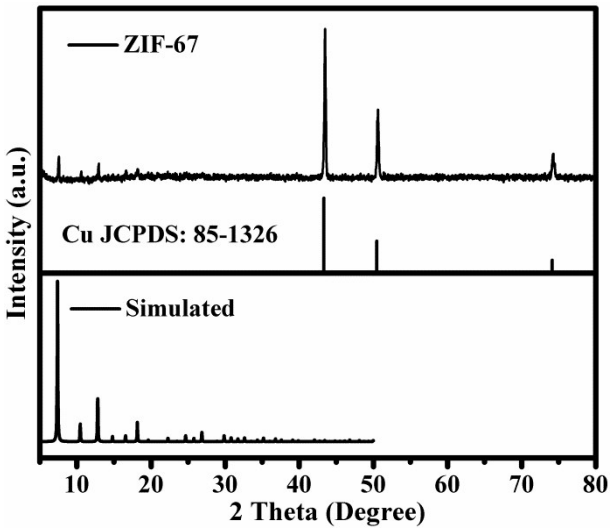


Figure S2 PXRD pattern of beaded ZIF-67 NAs on Cu foam.

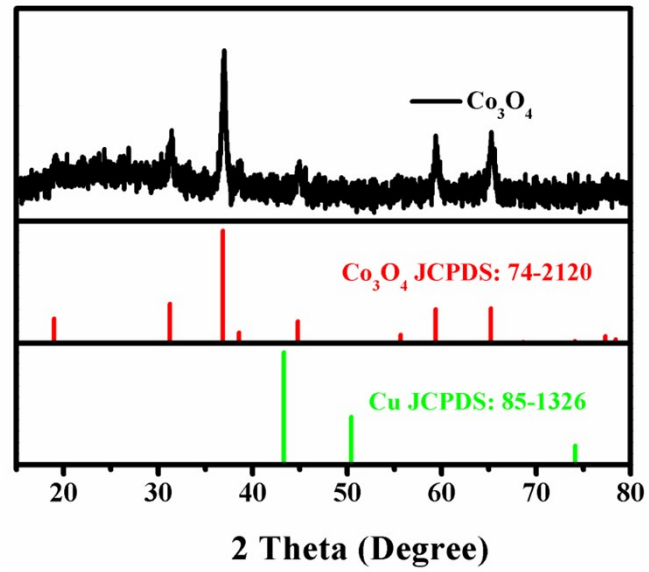


Figure S3 PXRD pattern of beaded Co_3O_4 NAs on Cu foam.

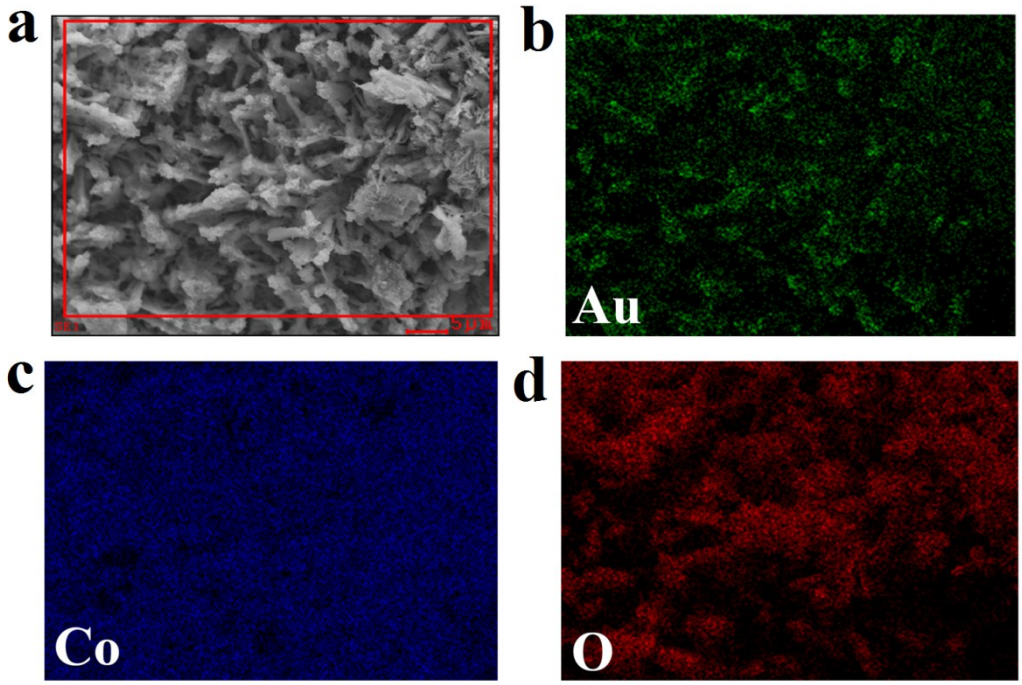
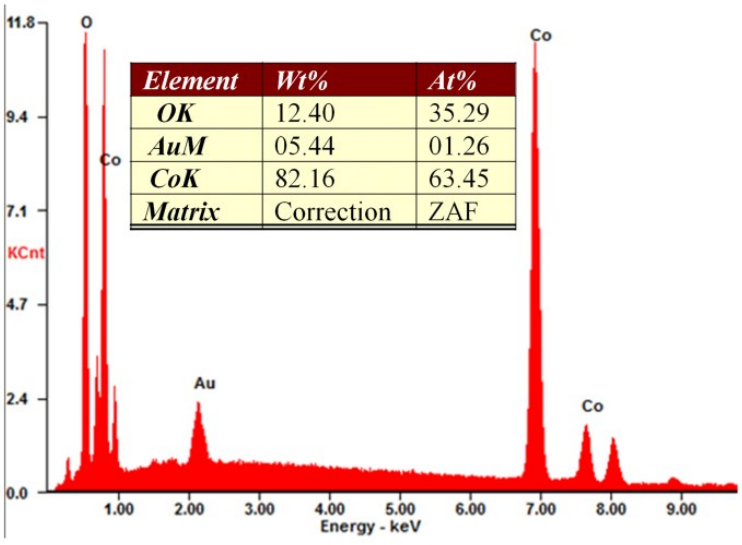


Fig.S4 (a) SEM images of Au@Co_3O_4 NAs on Cu foam after electrolysis and corresponding elemental mapping images of Au (b), Co (c) and O (d).



Element	*Wt%*	*At%*
OK	12.40	35.29
AuM	05.44	01.26
CoK	82.16	63.45
Matrix	Correction	ZAF

Figure S5 EDX spectrum of Au@Co_3O_4 NAs on Cu foam after electrolysis.

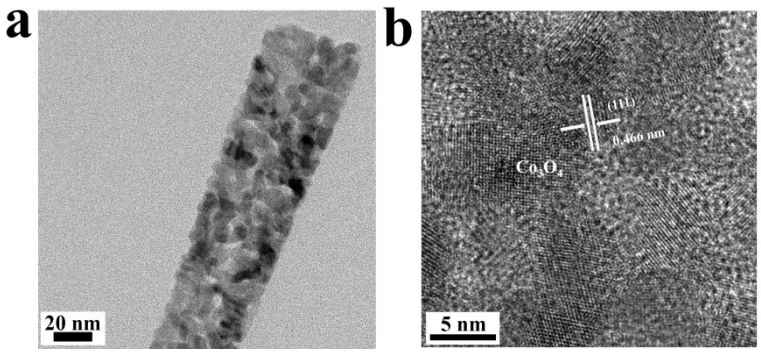


Figure S6 TEM and HRTEM images of Co_3O_4 NAs.

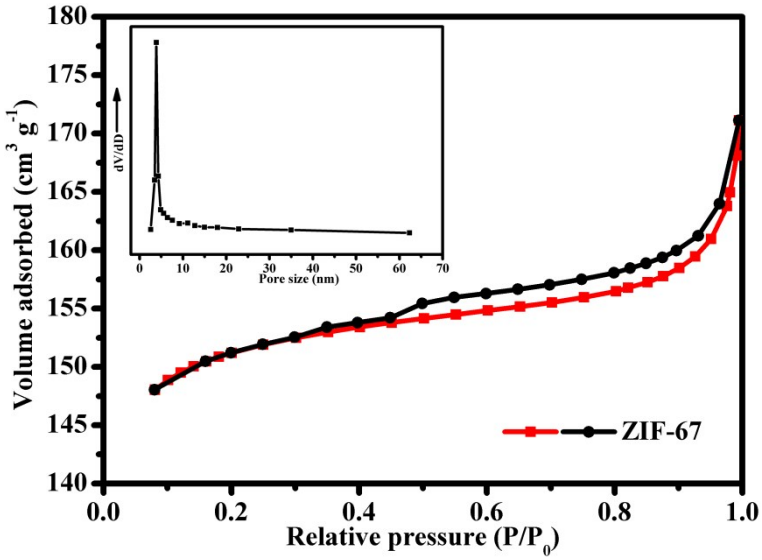


Figure S7 N_2 adsorption-desorption isotherm and the pore size distribution of the ZIF-67 NAs.

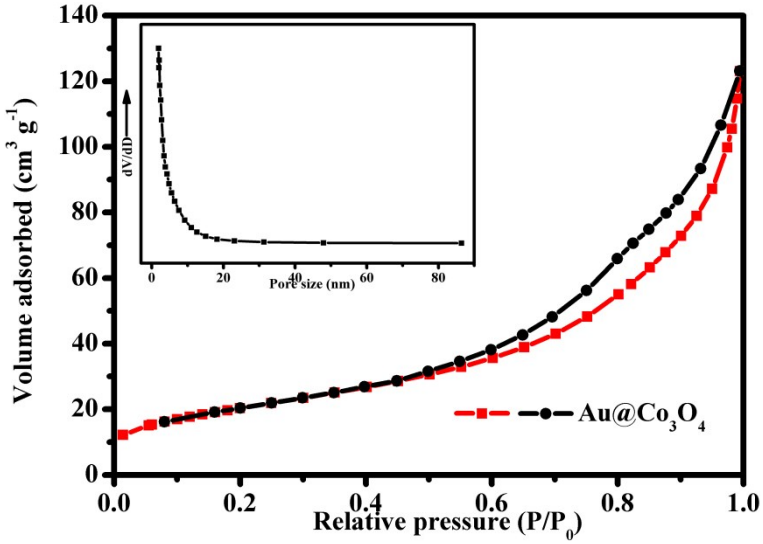


Figure S8 N_2 adsorption-desorption isotherm and the pore size distribution of the Au@Co_3O_4 NAs.

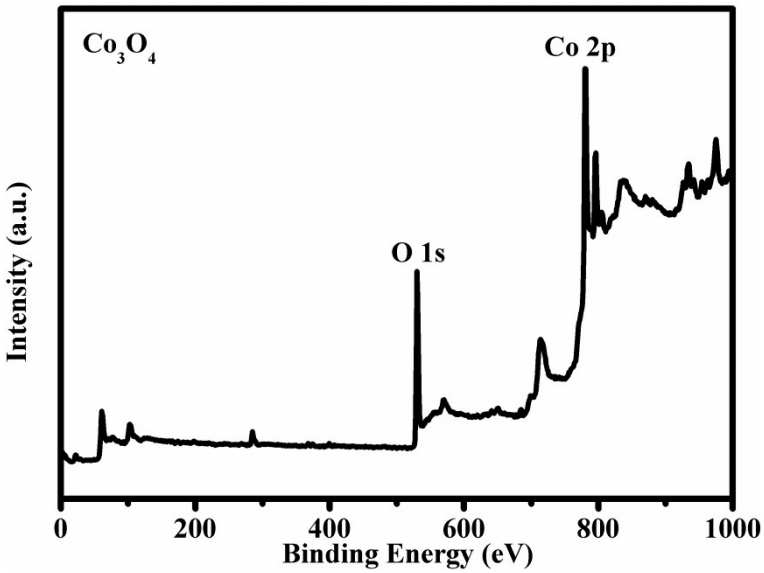


Figure S9 XPS survey spectrum of Co_3O_4 material.

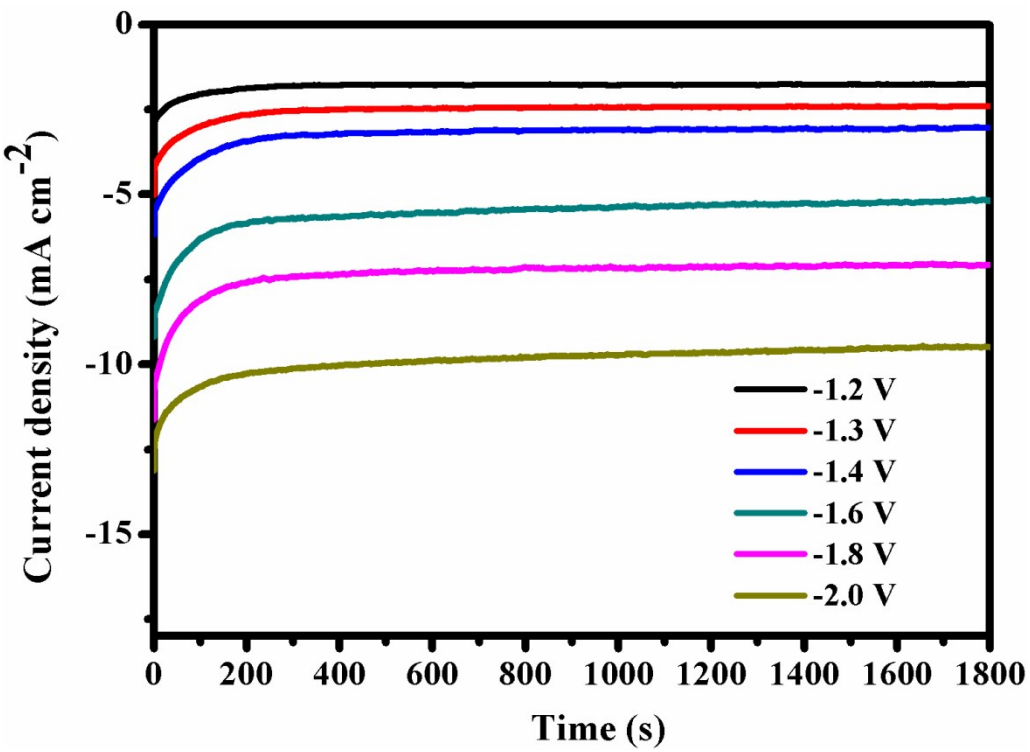


Figure S10 CPE plots for Cu foam in 0.1 M $KHCO_3$ at different potentials under CO_2 during 1800 s, respectively.

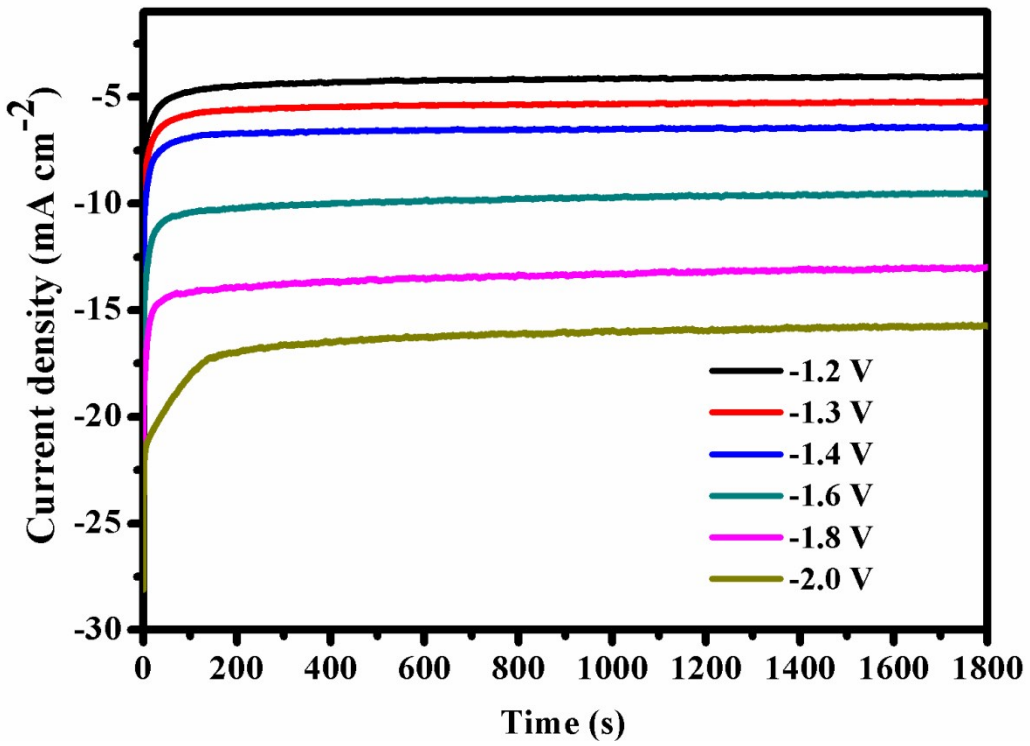


Figure S11 CPE plots for Co_3O_4 NAs in 0.1 M $KHCO_3$ at different potentials under CO_2 during 1800 s, respectively.

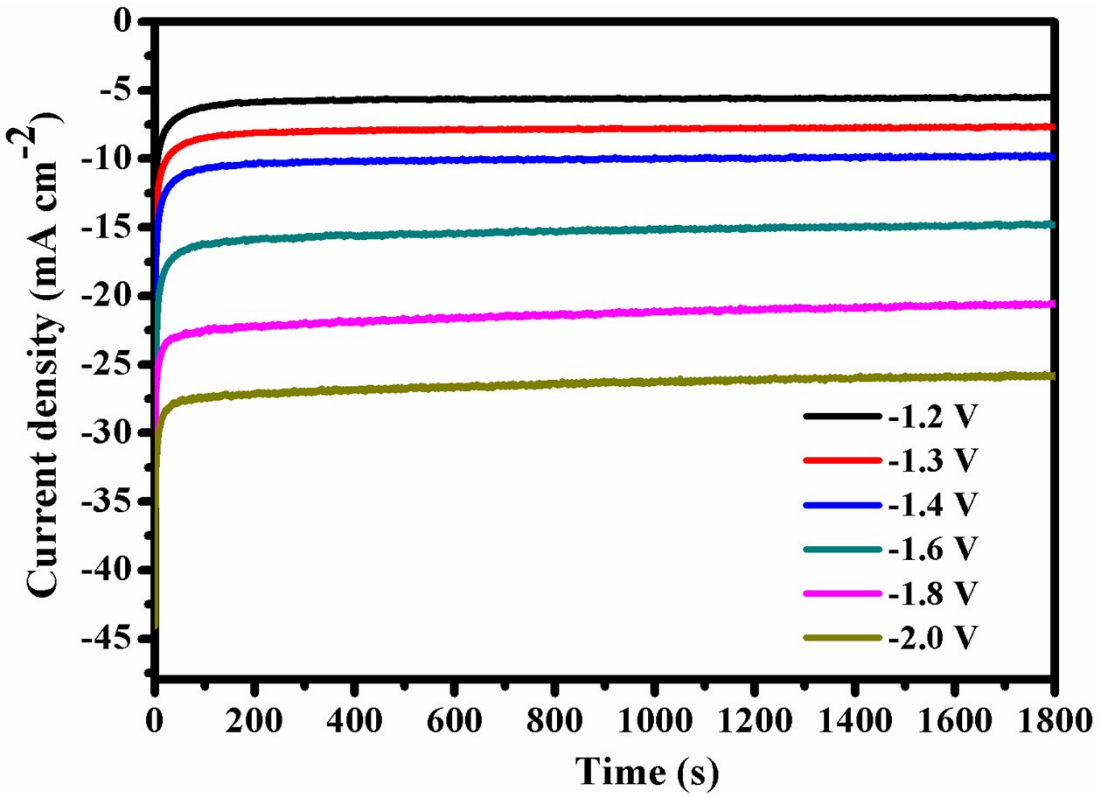


Figure S12 CPE plots for Au@Co_3O_4 NAs in 0.1 M $KHCO_3$ at different potentials under CO_2 during 1800 s, respectively.

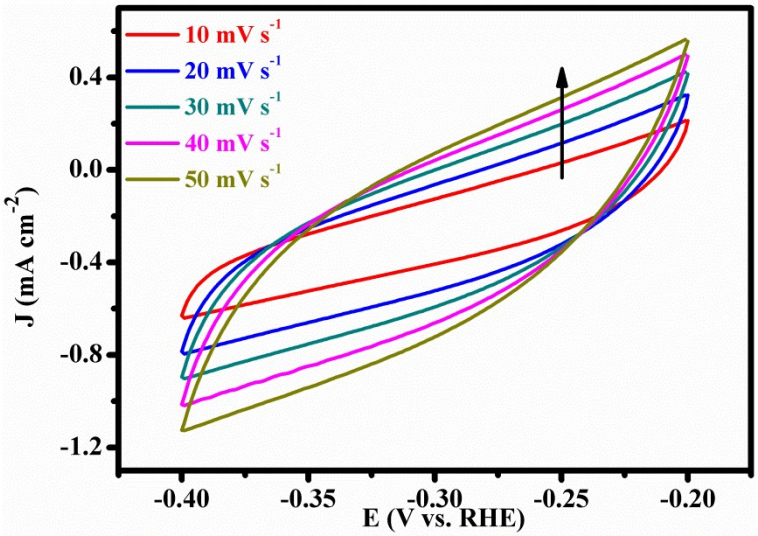


Figure S13 CVs of Co_3O_4 NAs recorded at different scan rates (10, 20, 30, 40 and 50 mV s^{-1}).

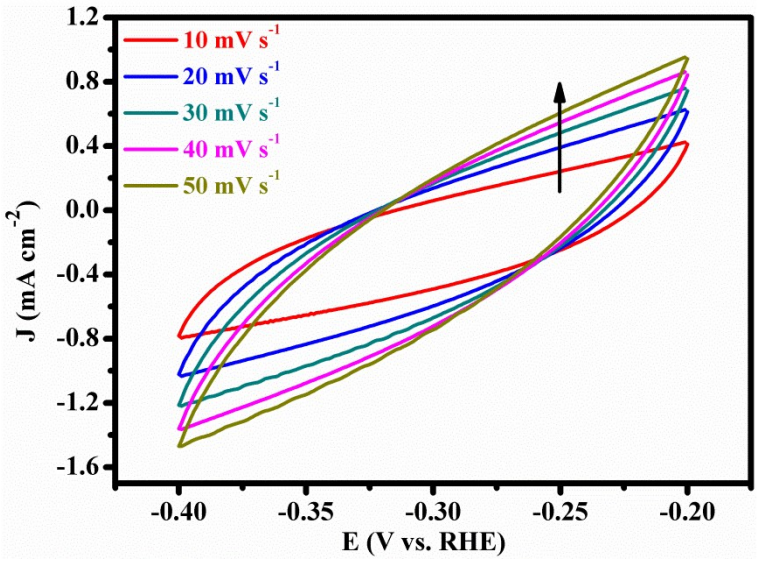


Figure S14 CVs of Au@Co_3O_4 NAs recorded at different scan rates (10, 20, 30, 40 and 50 mV s^{-1}).

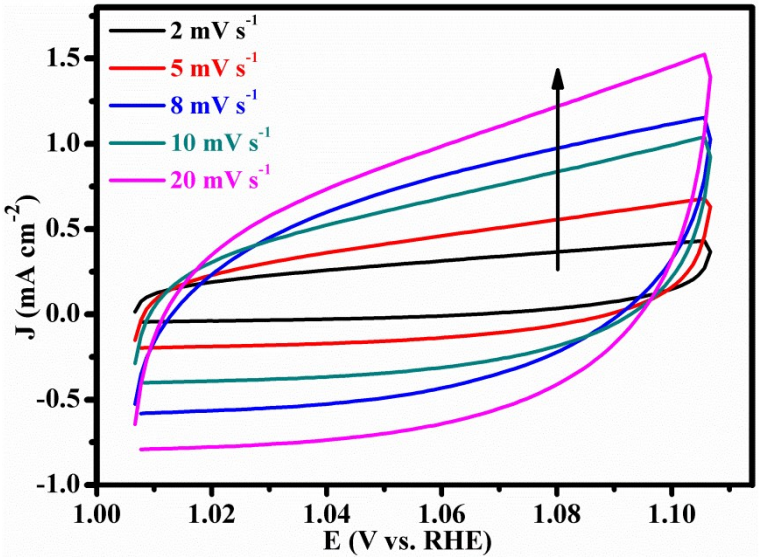


Figure S15 CVs of Co_3O_4 NAs recorded at different scan rates (2, 5, 8, 10 and 20 mV s^{-1}).

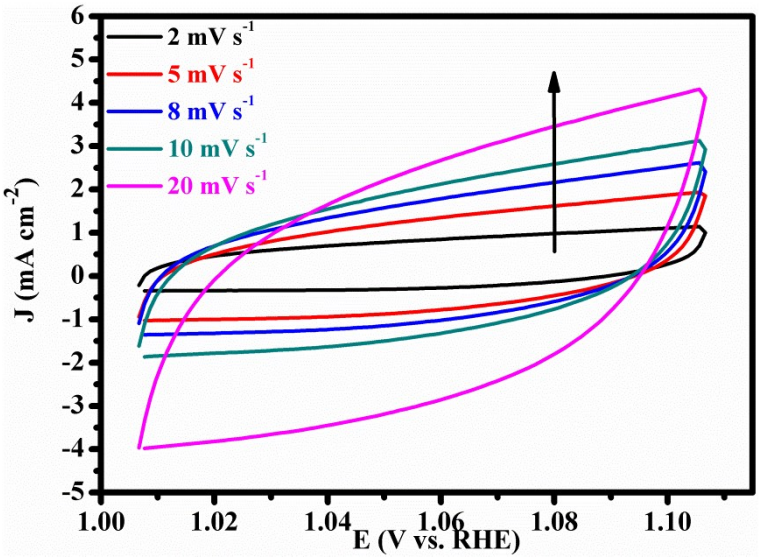


Figure S16 CVs of Au@Co_3O_4 NAs recorded at different scan rates (2, 5, 8, 10 and 20 mV s^{-1}).

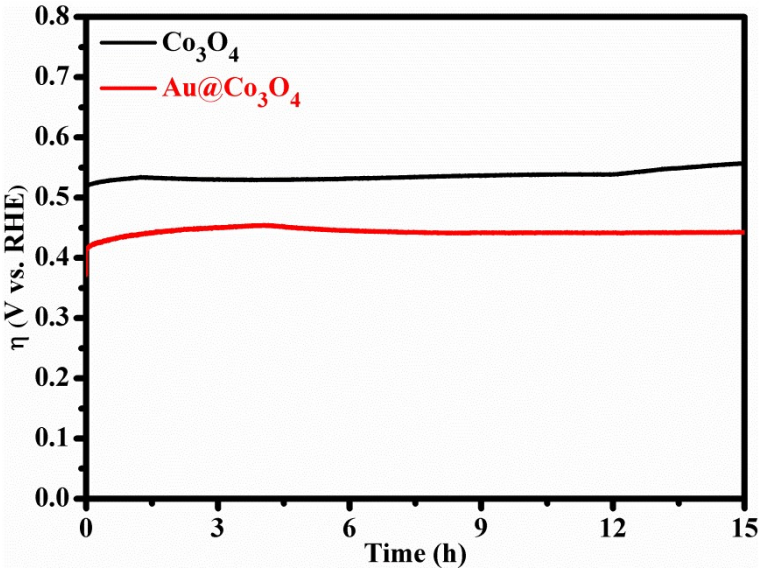


Figure S17 CP plots for Au@Co_3O_4 NAs and Co_3O_4 NAs in 1.0 M KOH at 50 mA cm^{-2}.

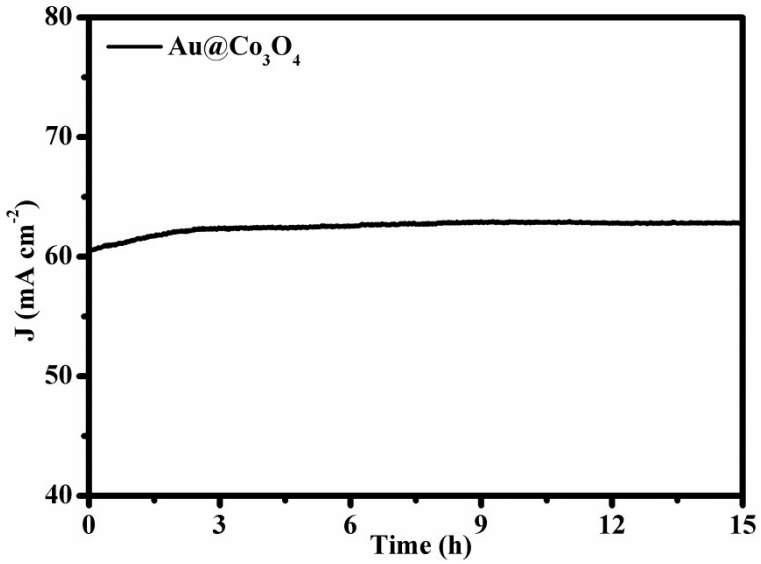


Figure S18 CPE plot for Au@Co_3O_4 NAs in 1.0 M KOH at 1.7 V vs. RHE.

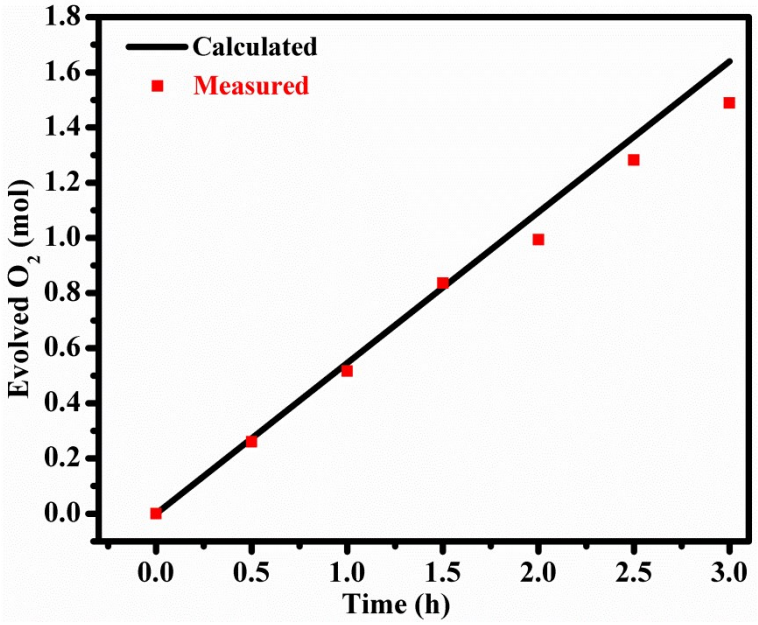


Figure S19 Calculated and measured oxygen amount against electrolysis time for Au@Co_3O_4 NAs at the fixed potential of 1.70 V vs. RHE.