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Electronic Supplementary Information

Reduced graphene oxide intercalated Co_2C or Co_4N nanoparticles as an efficient and durable fuel cell catalyst for oxygen reduction

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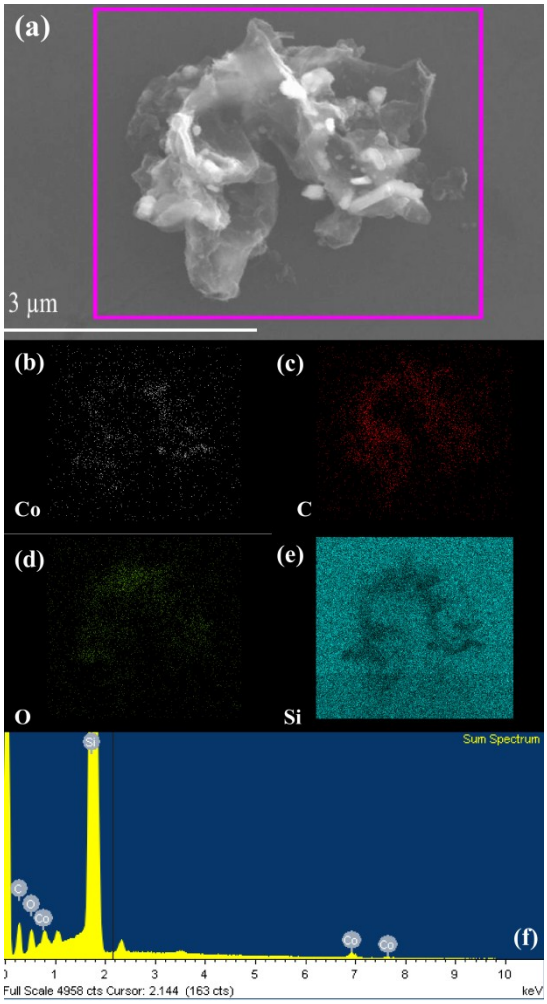

Figure S1. (a) SEM image, elemental mapping of (b) cobalt (c) carbon (d) oxygen (e) silicon substrate, and (f) EDS spectrum of Co_2C/rGO.

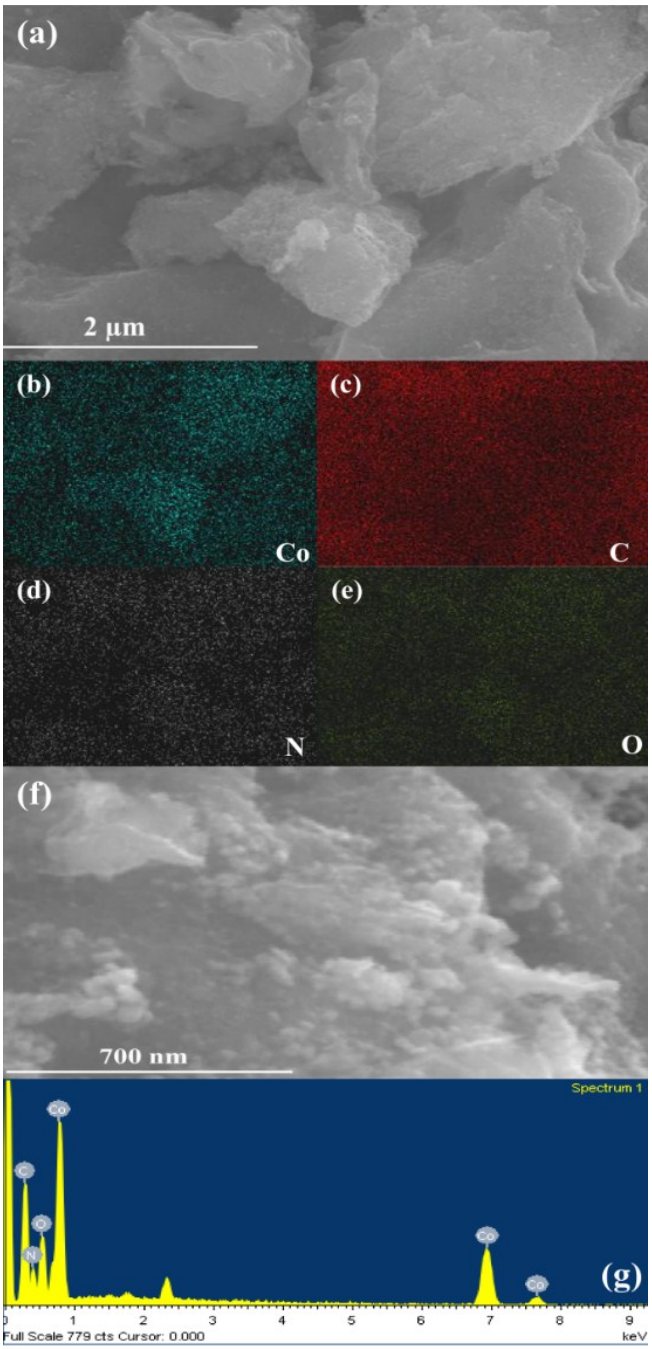

Figure S2. (a) SEM image, corresponding elemental mapping of (b) cobalt (c) carbon (d) nitrogen (e) oxygen. (f) SEM image and (g) EDS spectrum of Co_4N/rGO.

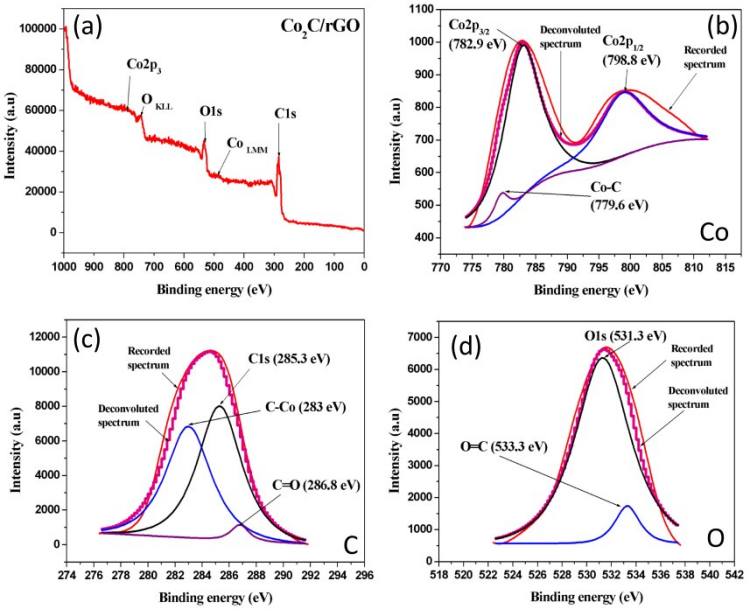

Figure S3. (a) XPS spectrum of Co_2C/rGO. High-resolution XPS spectra of (b) cobalt, (c) carbon and (d) oxygen.

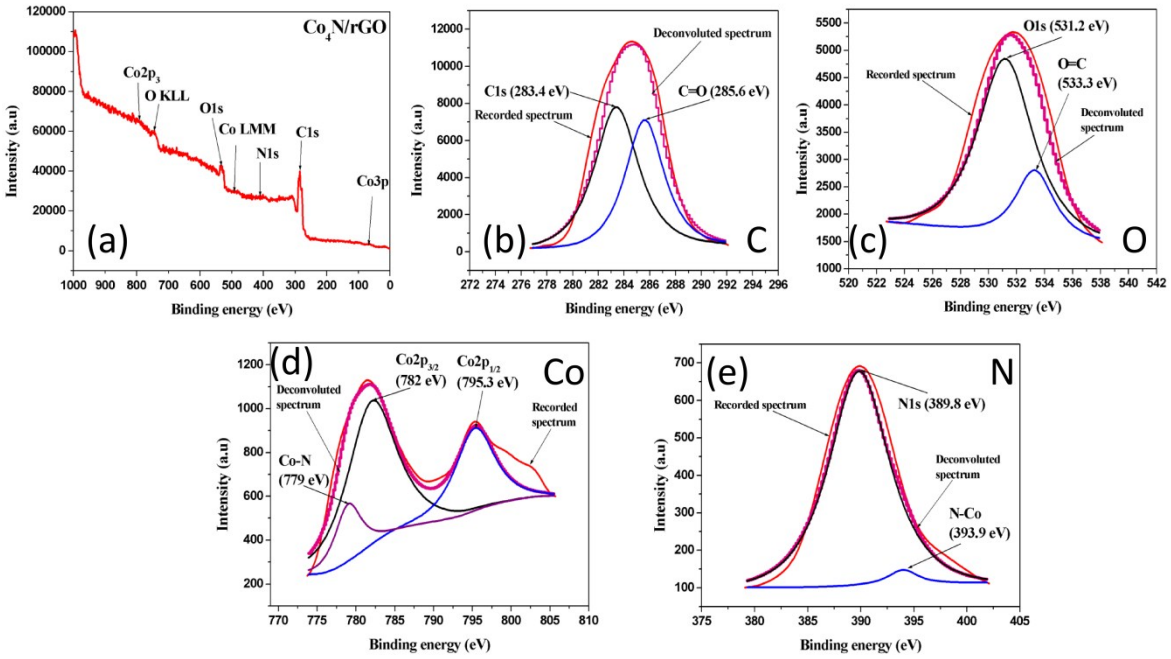

Figure S4. (a) XPS spectrum of Co_4N/rGO. High-resolution XPS spectra of (b) carbon, (c) oxygen, (d) cobalt and (e) nitrogen.

Table S1. On-set potential, peak current density, electron transfer coefficient, and current retention of Co_4N/rGO, Co_2C/rGO, and other related catalysts.

Electrocatalyst	**On-set potential E_{on} (V vs. Ag/AgCl)**	**Peak current density J (mA cm^{-2})**	**Electron transfer coefficient**	**Current retention (%) for 5000 seconds**	**Reference**
Co_4N/rGO	-0.08	2.76	0.58	99.91	This work
Co_2C/rGO	-0.04	2.21	0.31	99.95	This work
Co/N-C	-0.06	1.23	-	96	13
Cr_2O_3/rGO	-0.27	1.58	-	84.6	23
VC	-0.07	0.12	-	79	44
V(C, N)	-0.04	0.13	-	43	44
Pt/C	-0.1	0.52	0.48	15.8	45
PtFe/C	-	-	0.55	-	45
WC	-0.07	1.00	-	96.7	46
Fe_xN/N-graphene	-0.04	2.48	-	95	47
Ni_3N/N-RGO	0.8 (V vs. RHE)	1.2	-	-	51