Supporting Information

Interacting MXene Nanosheets with Cobalt-Tipped Carbon Nanotubes for Efficient Oxygen Reduction Reaction

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Supporting Figures

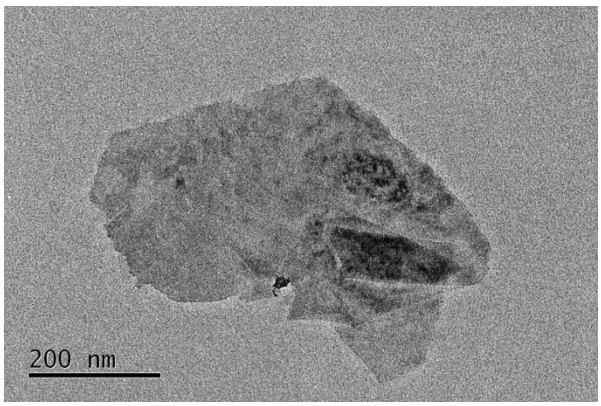

Figure S1. TEM image of Ti_3C_2 nanosheets.

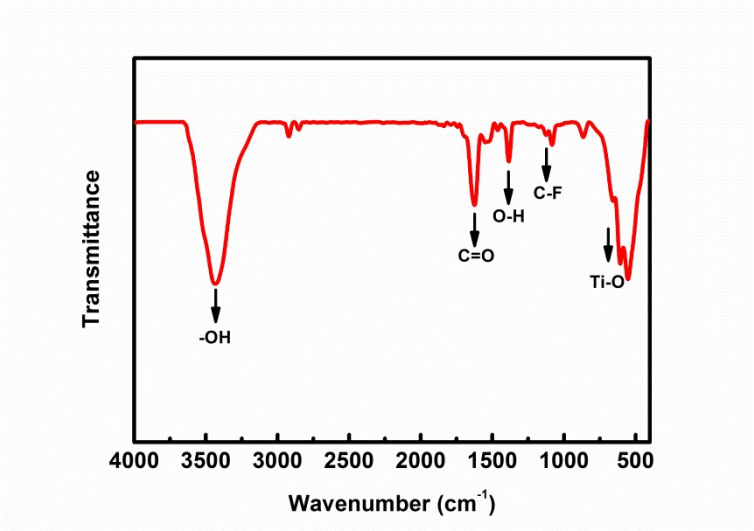

Figure S2. FTIR spectrum of Ti_3C_2 nanosheets.

The function groups on the surface of Ti_3C_2 were examined by Fourier Transformed Infrared (FTIR) Spectroscopy. Peaks at 3430 cm^{-1}, 1630 cm^{-1}, 1390 cm^{-1}, 1100 cm^{-1} and 662 cm^{-1} can be attributed to the stretching vibrations of –OH, C=O, O–H, C–F and Ti–O bonds, which agreed well with the previous report.[1]

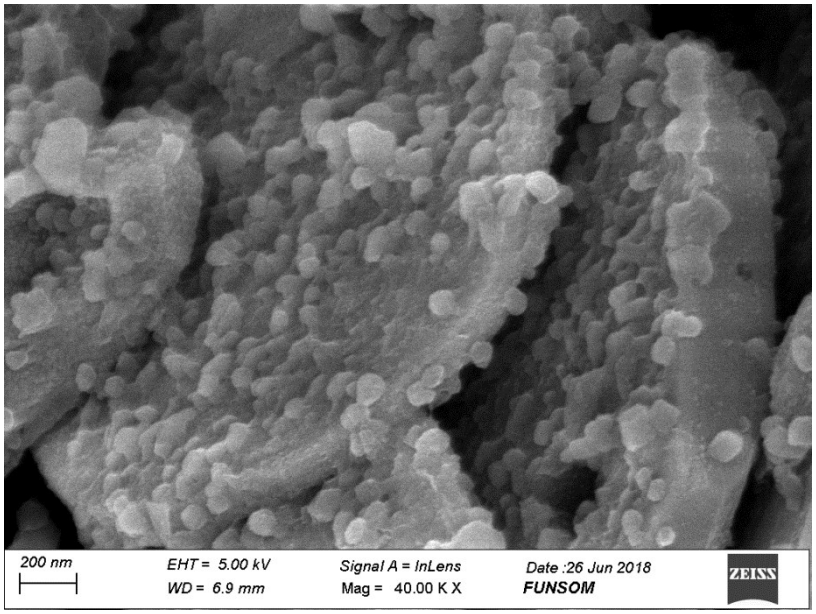

Figure S3. SEM image of ZIF-67/Ti_3C_2-60.

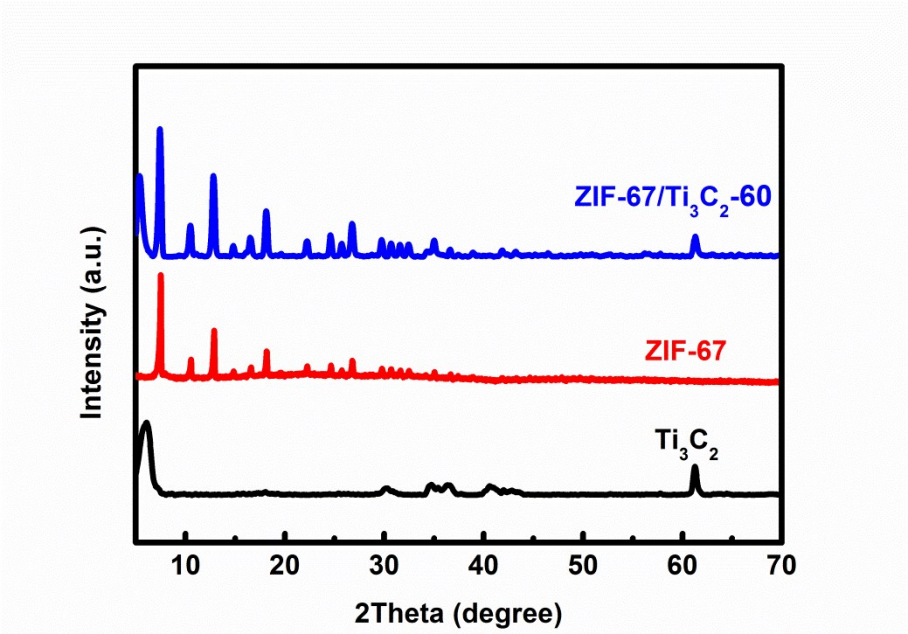

Figure S4. XRD patterns of Ti_3C_2, ZIF-67 and ZIF-67/Ti_3C_2-60.

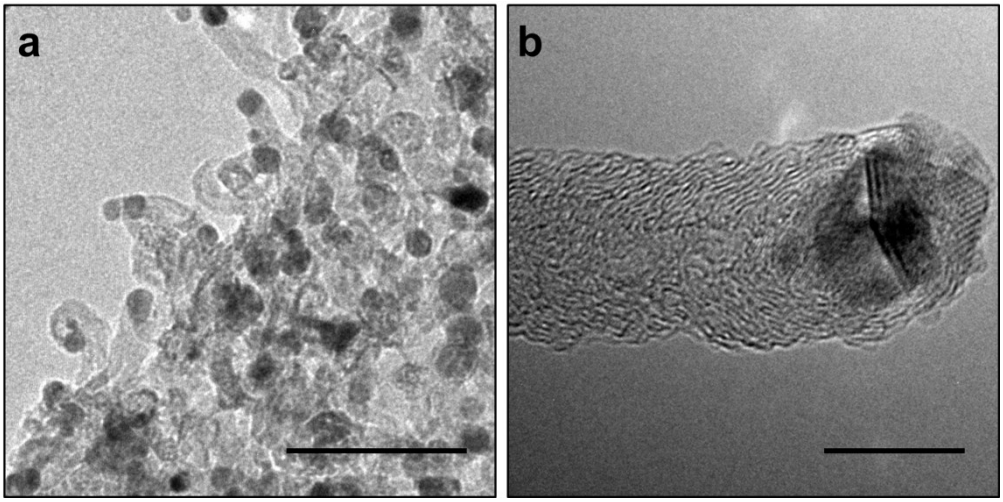

Figure S5. TEM and HRTEM images of Co-CNT/Ti_3C_2-60. Scale bars are 100 nm and 10 nm in (a) and (b), respectively.

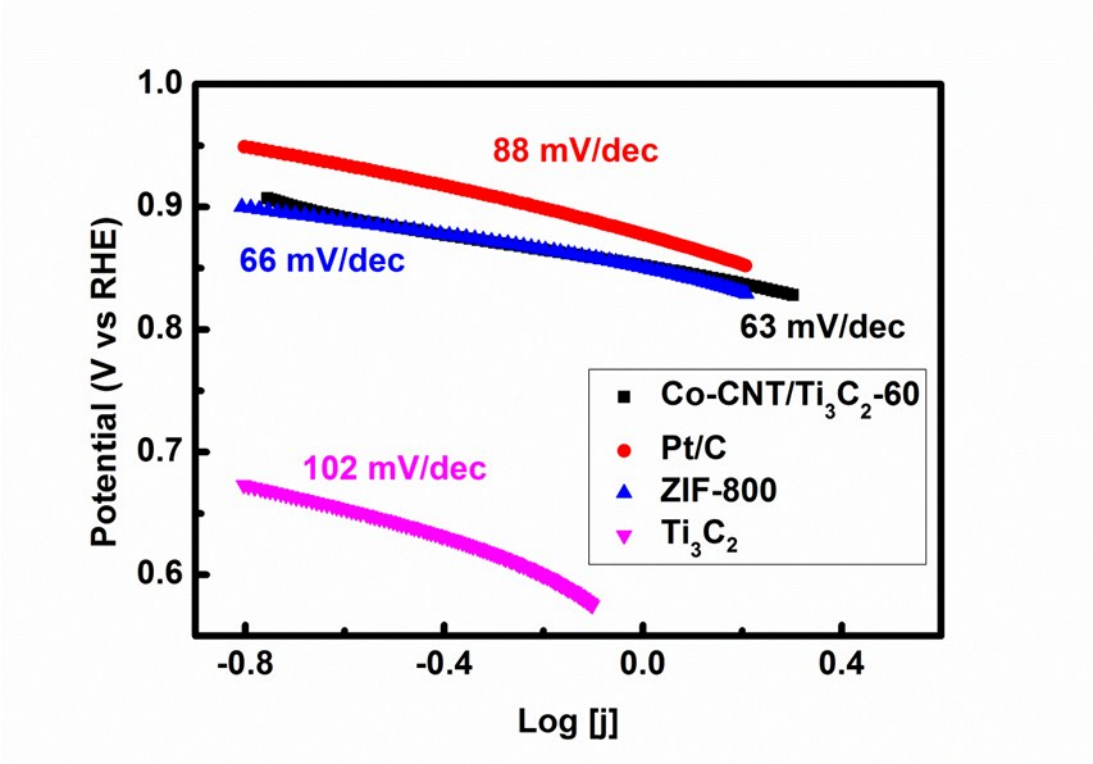

Figure S6. Tafel plots of Co-CNT/Ti_3C_2-60, Pt/C, ZIF-800 and Ti_3C_2.

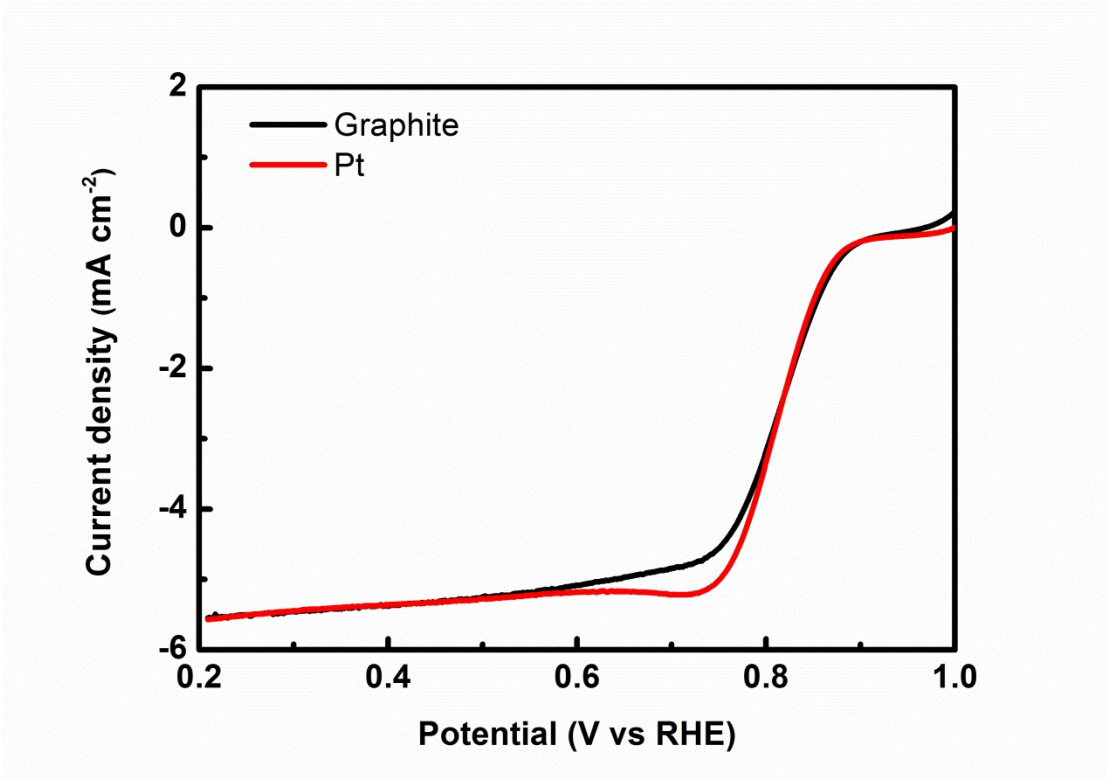

Figure S7. LSV curves of Co-CNT/Ti_3C_2-60 with graphite rod (black) and Pt (red) as counter electrode.

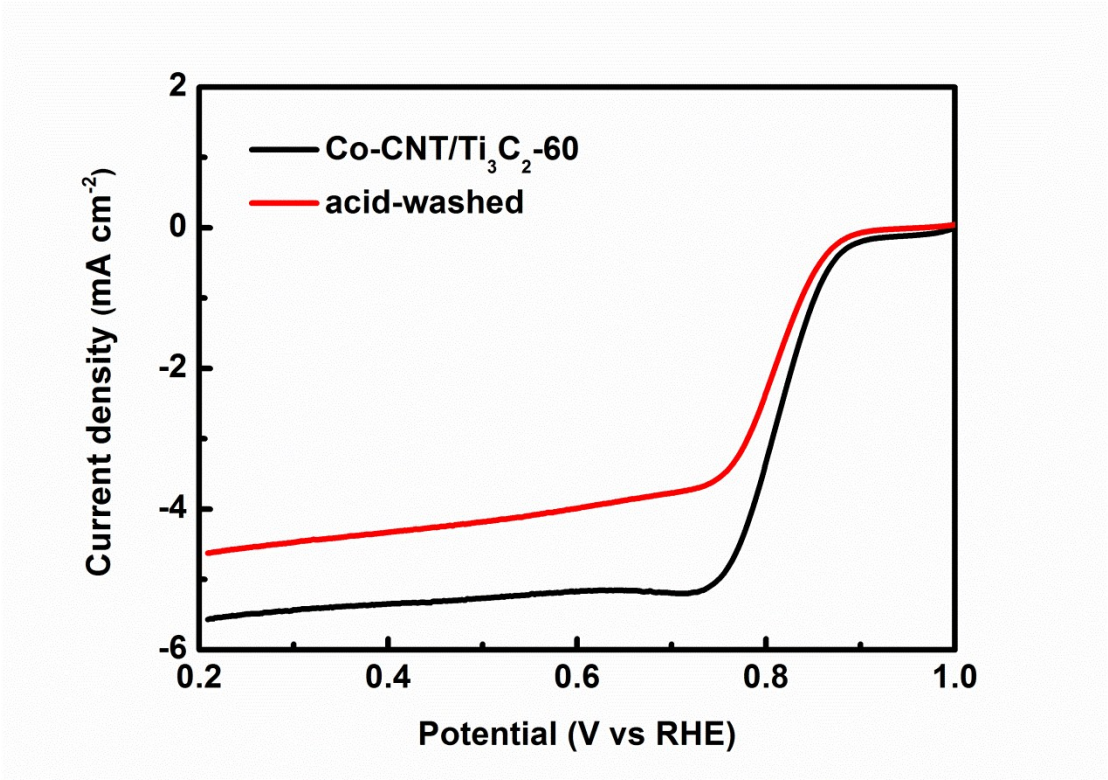

Figure S8. LSV curve of Co-CNT/Ti_3C_2-60 after acid treatment.

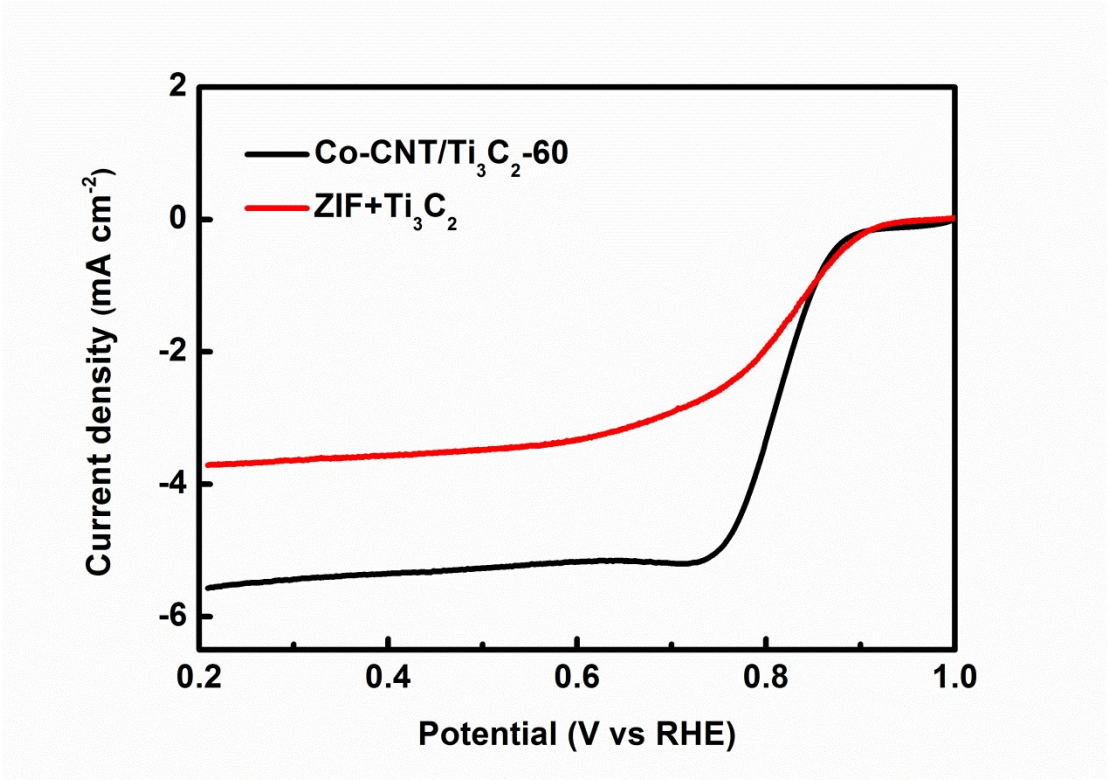

Figure S9. LSV curve of ZIF-800 and Ti_3C_2 mixture.

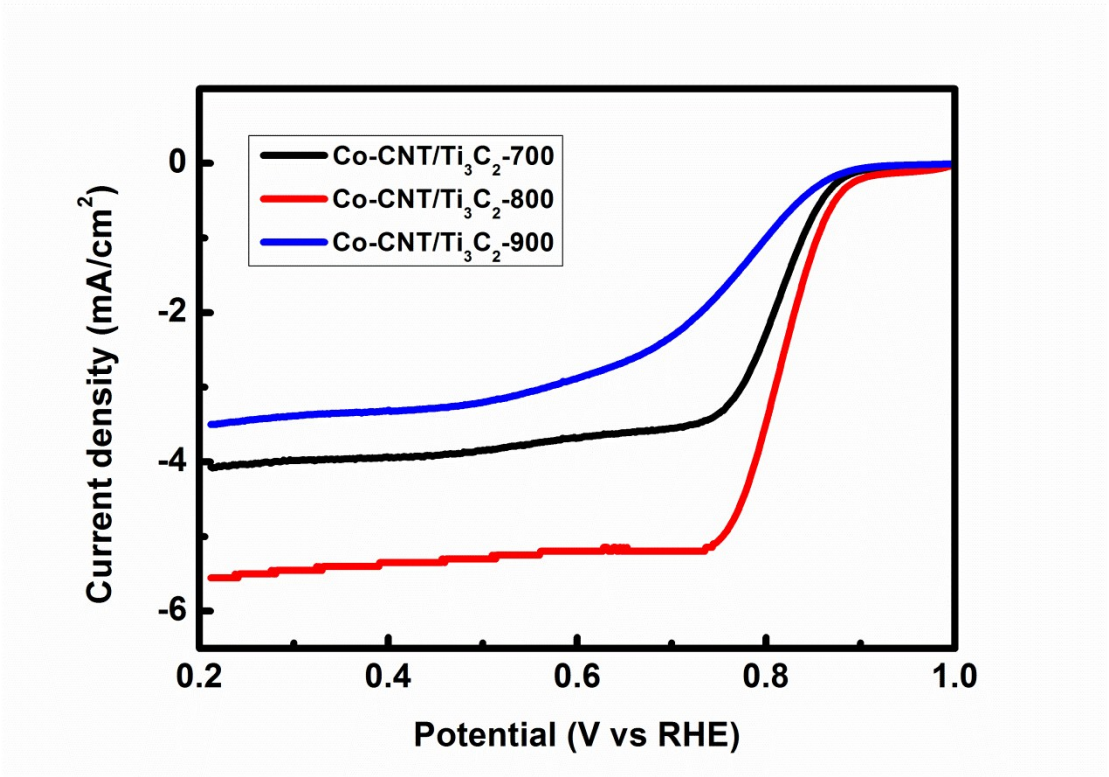

Figure S10. LSV curve of ZIF-67/Ti_3C_2 with different pyrolysis temperatures.

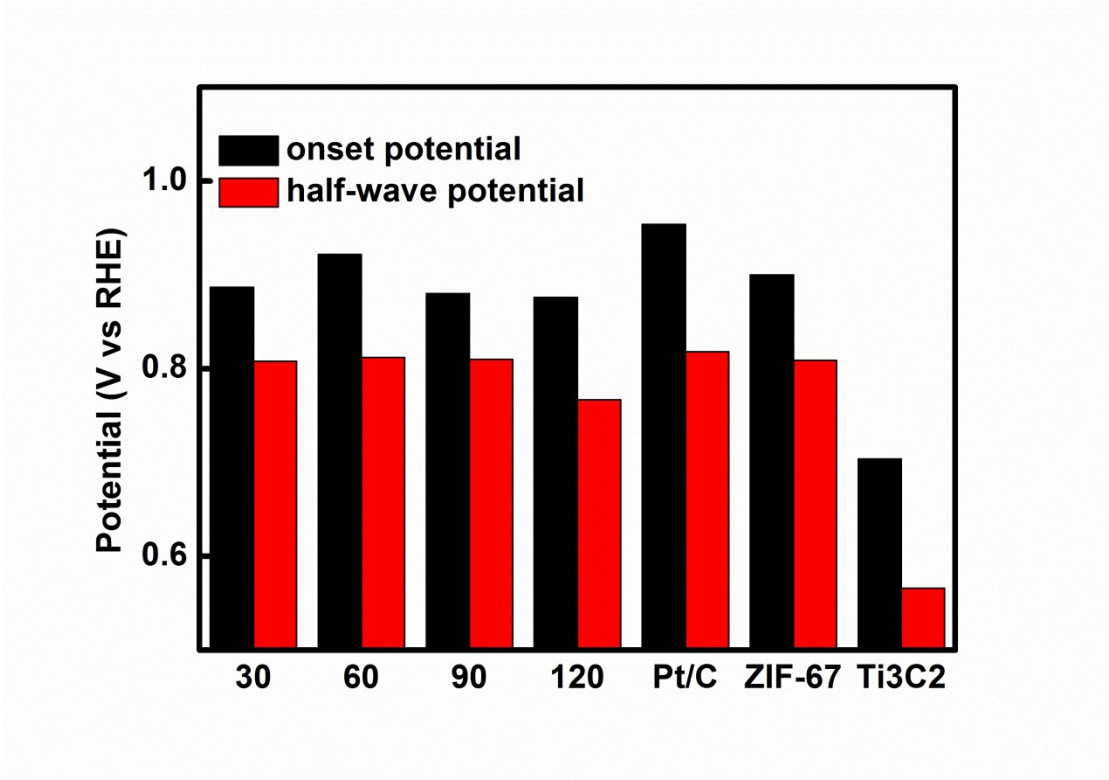

Figure S11. Onset potential and half-wave potential of Co-CNT/Ti_3C_2-30, Co-CNT/Ti_3C_2-60, Co-CNT/Ti_3C_2-90, Co-CNT/Ti_3C_2-120, Pt/C, ZIF and Ti_3C_2.

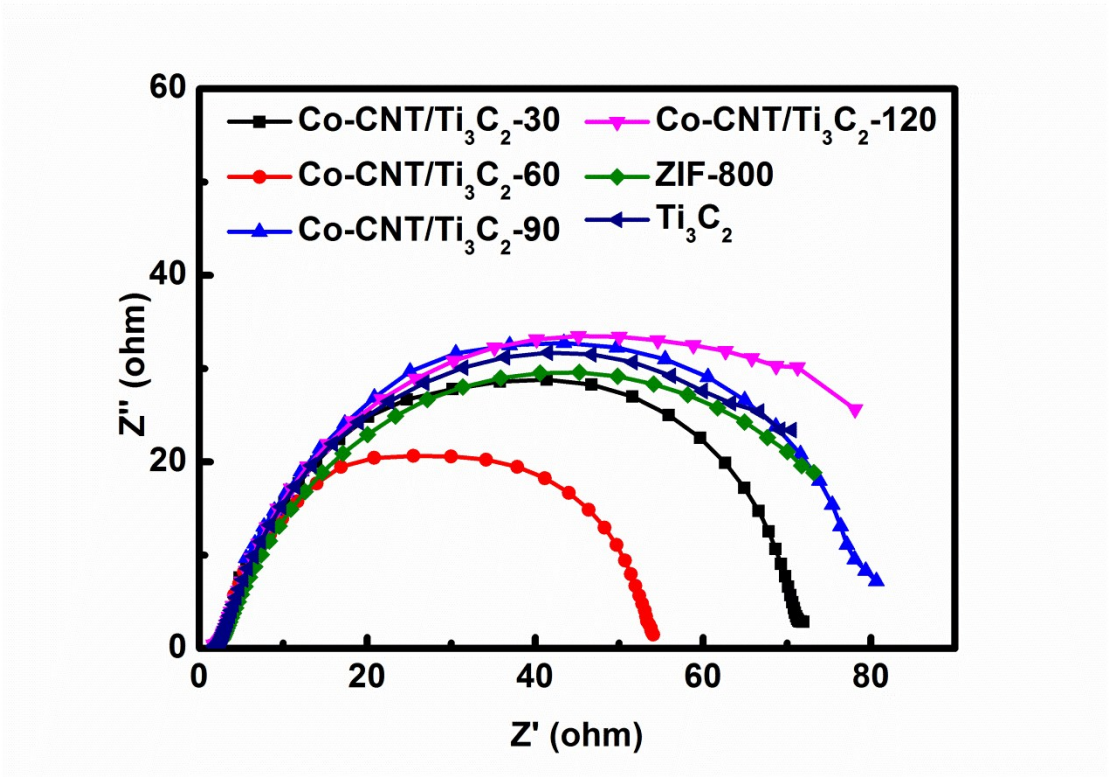

Figure S12. Electrochemical impedance spectroscopy (EIS) plots for Co-CNT/Ti_3C_2-30, Co-CNT/Ti_3C_2-60, Co-CNT/Ti_3C_2-90, Co-CNT/Ti_3C_2-120, ZIF-800 and Ti_3C_2.

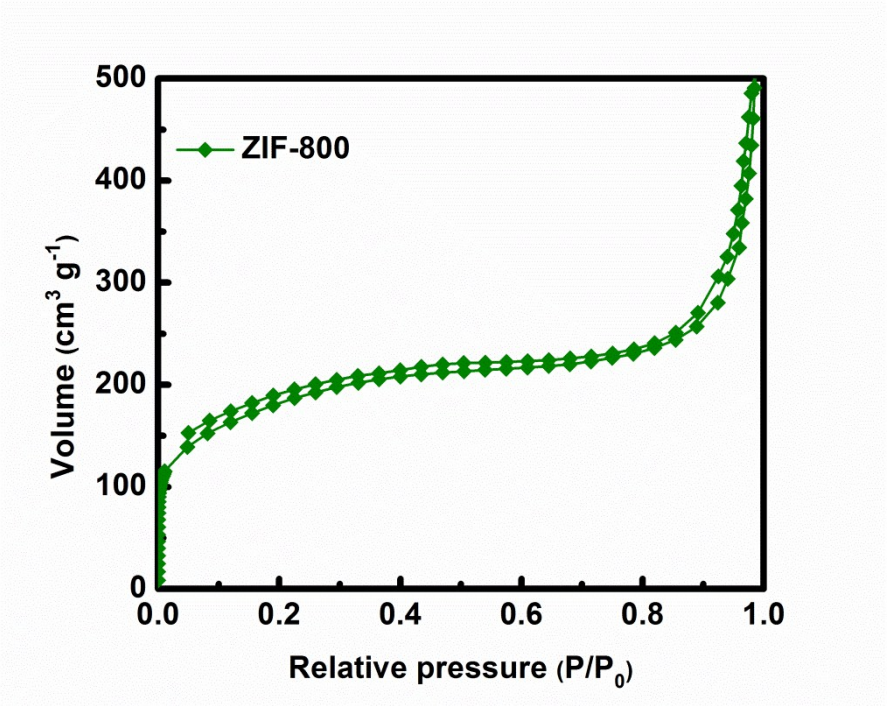

Figure S13. Nitrogen adsorption desorption isotherms of ZIF-800.

Table S1. Comparisons of ORR performance between recent reported cobalt-based electrocatalysts with Co-CNT/Ti_3C_2-60.

Electrocatalysts	$E_{1/2}$ (V vs RHE)	Electron transfer number (n)	Tafel slope (mV/dec)	Reference
CeO_2−Co−NC hollow nanospheres	0.80	3.61-3.78	60	2
Co−N/CNFs	0.82	~3.88	NG	3
$CuCoO_x$/FeOOH	0.78	3.87−3.92	NG	4
Co-N,B-CSs	0.83	3.98-4.00	64	5
LDH@ZIF-67-800	0.83	~4.00	63	6
NC@Co-NGC DSNCs	0.82	~4.00	51	7
Co@Co_3O_4/NC-1	0.80	~4.00	NG	8
Co@Co_3O_4@C−CM	0.81	3.80-3.90	NG	9
Co@NG	0.83	>3.80	NG	10
Co-CNT/Ti_3C_2-60	**0.82**	**>3.90**	**63**	**This work**

Supporting References

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