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

Supporting Information

Sandwich-like Co_3O_4/MXene composites as high capacity electrodes for lithium-ion batteries

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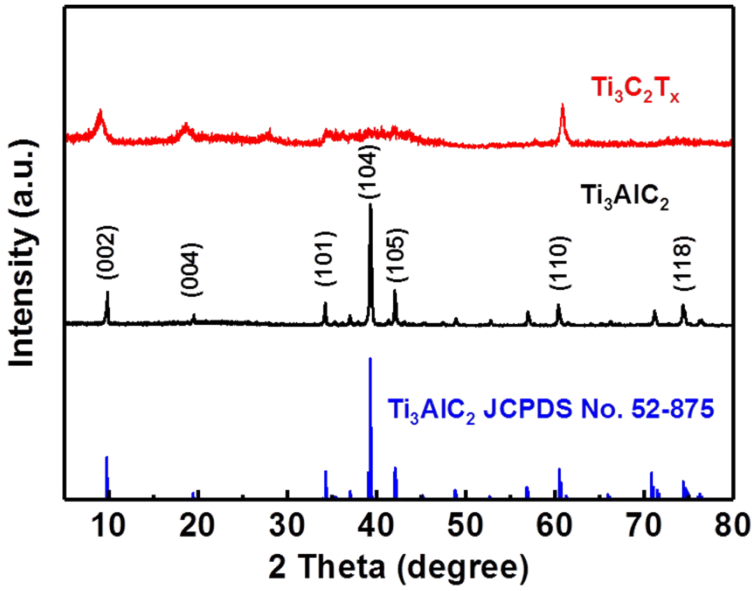

Figure S1. X-ray diffraction of $Ti_3C_2T_x$ and Ti_3AlC_2.

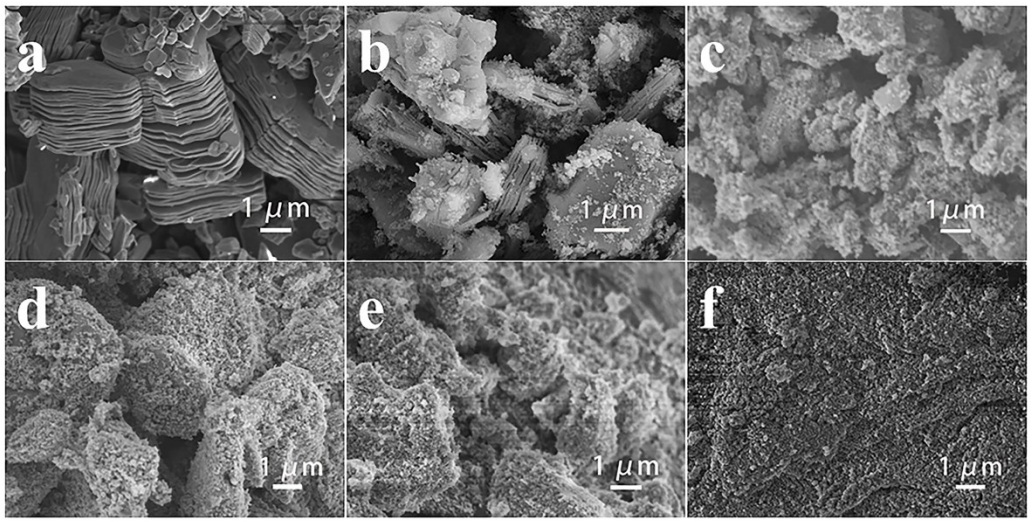

Figure S2. Low-resolution SEM images of (a) $Ti_3C_2T_x$, (b) $Co_3O_4/Ti_3C_2T_x$-1, (c) $Co_3O_4/Ti_3C_2T_x$-2, (d) $Co_3O_4/Ti_3C_2T_x$-3, (e) $Co_3O_4/Ti_3C_2T_x$-4 and (f) Co_3O_4.

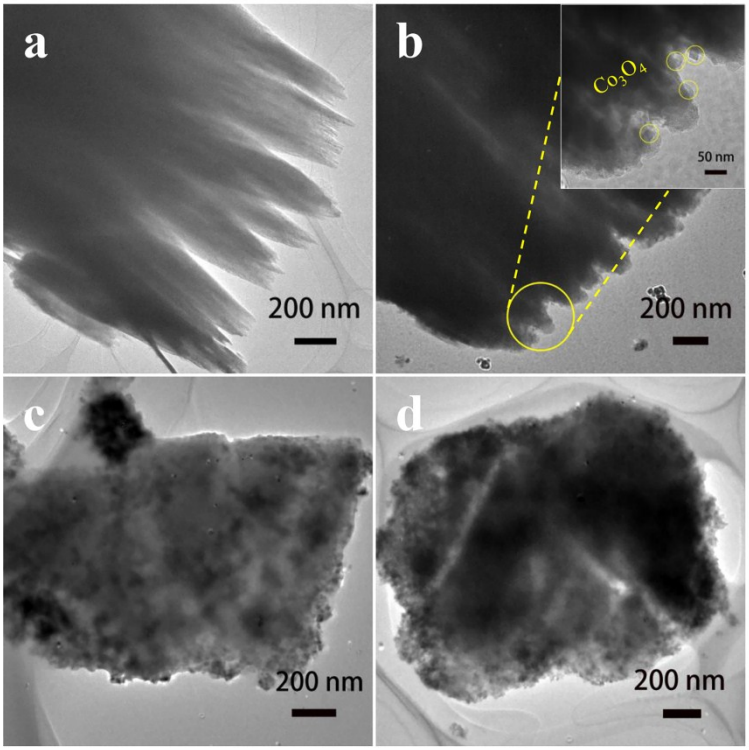

Figure S3. TEM images of (a) $Ti_3C_2T_x$, (b) $Co_3O_4/Ti_3C_2T_x$-2, (c) $Co_3O_4/Ti_3C_2T_x$-3 and (d) $Co_3O_4/Ti_3C_2T_x$-4.

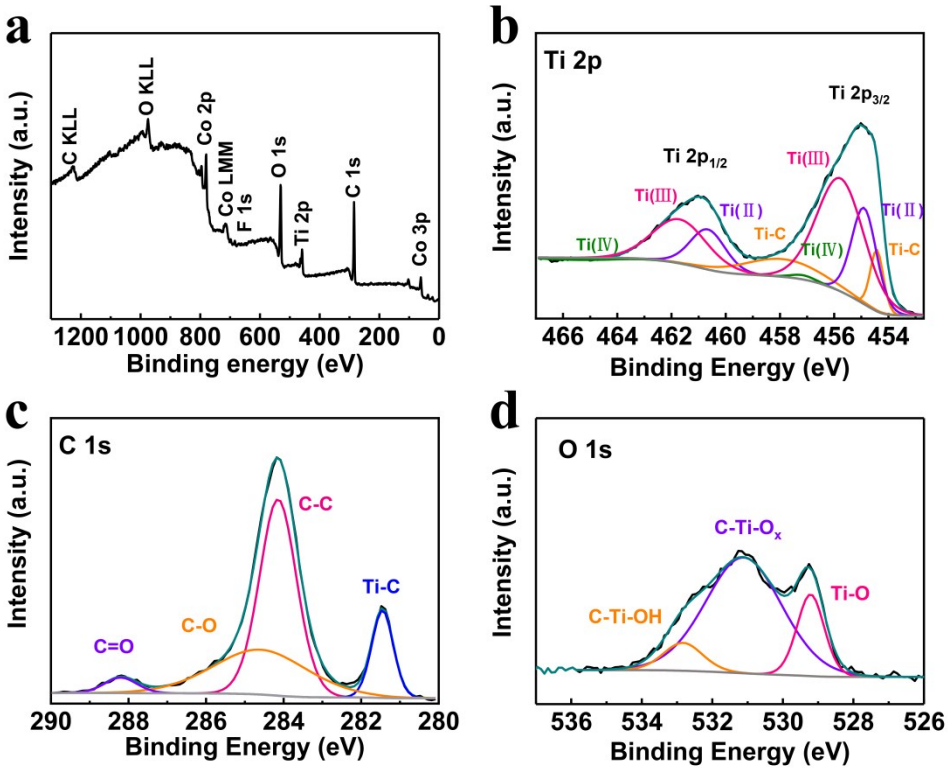

Figure S4. (a) XPS wide spectra of $Co_3O_4/Ti_3C_2T_x$-3. XPS fine spectra of (b) Ti, (c) C and (d) O for $Ti_3C_2T_x$.

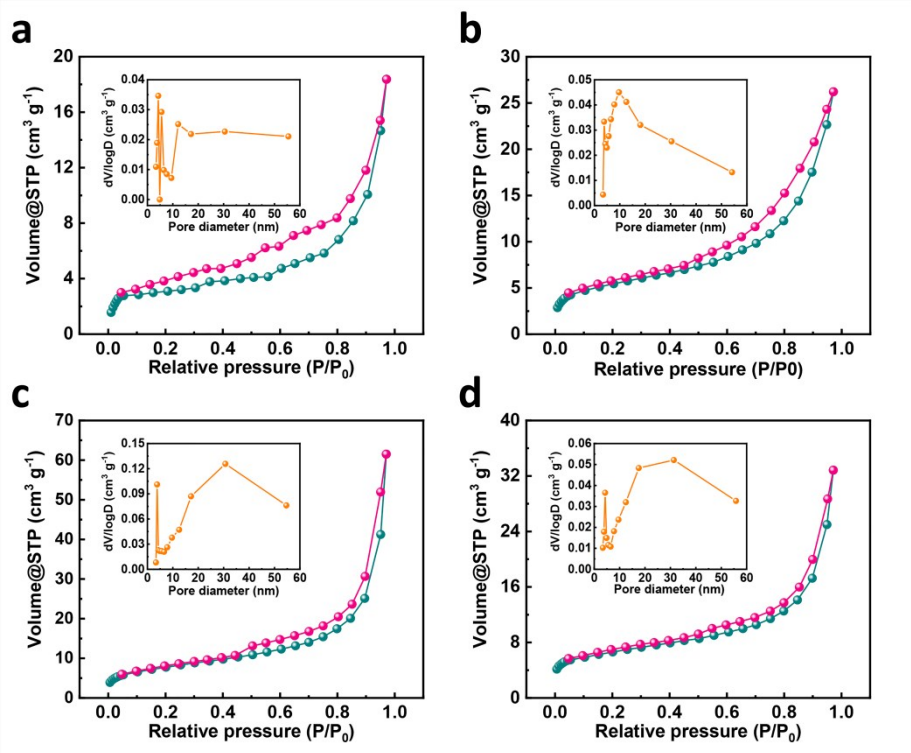

Figure S5. Nitrogen absorption/desorption isotherms (pink: nitrogen adsorption curve; dark cyan: nitrogen desorption curve) and pore diameter distribution (inset) of (a) $Co_3O_4/Ti_3C_2T_x$-1, (b) $Co_3O_4/Ti_3C_2T_x$-2, (c) $Co_3O_4/Ti_3C_2T_x$-3 and (d) $Co_3O_4/Ti_3C_2T_x$-4.

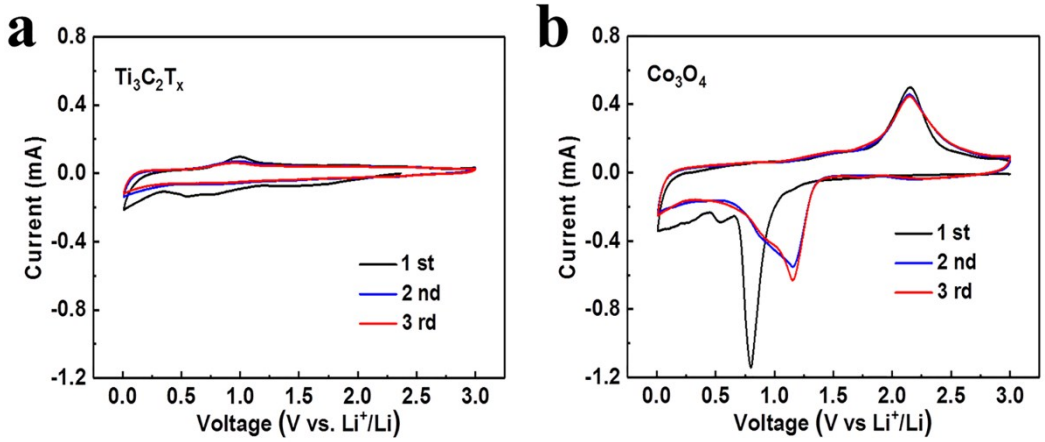

Figure S6. CV curves at 0.5 mV s^{-1} from 0.01 to 3 V of (a) $Ti_3C_2T_x$ and (b) Co_3O_4.

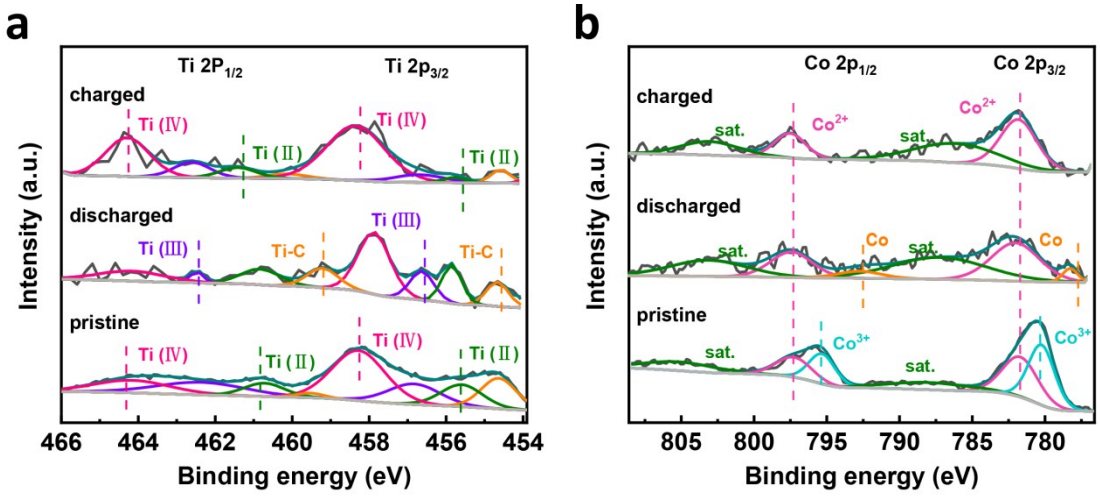

Figure S7. XPS fine spectra of (a) Ti, (b) Co of $Co_3O_4/Ti_3C_2T_x$-3 electrodes at pristine, fully discharged, and fully charged states.

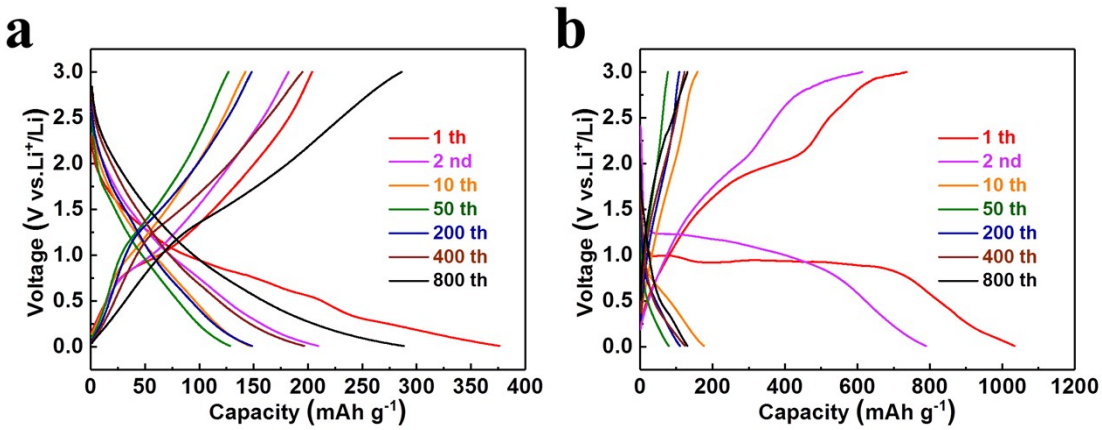

Figure S8. Galvanostatic charge-discharge curves at different cycles of (a) $Ti_3C_2T_x$ and (b) Co_3O_4 at 500 mA g^{-1}.

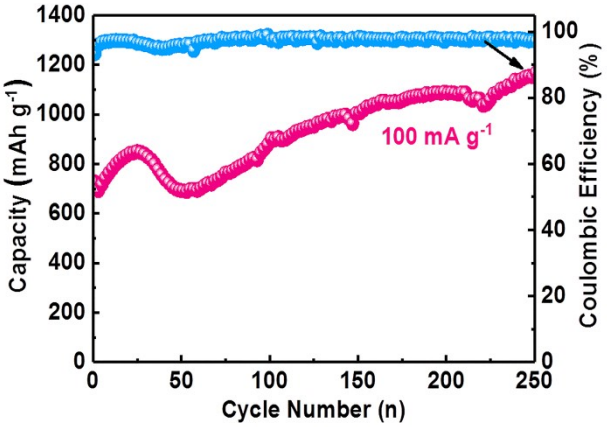

Figure S9. Cycling performance at 100 mA g^{-1} and coulombic efficiency of $Co_3O_4/Ti_3C_2T_x$-3.

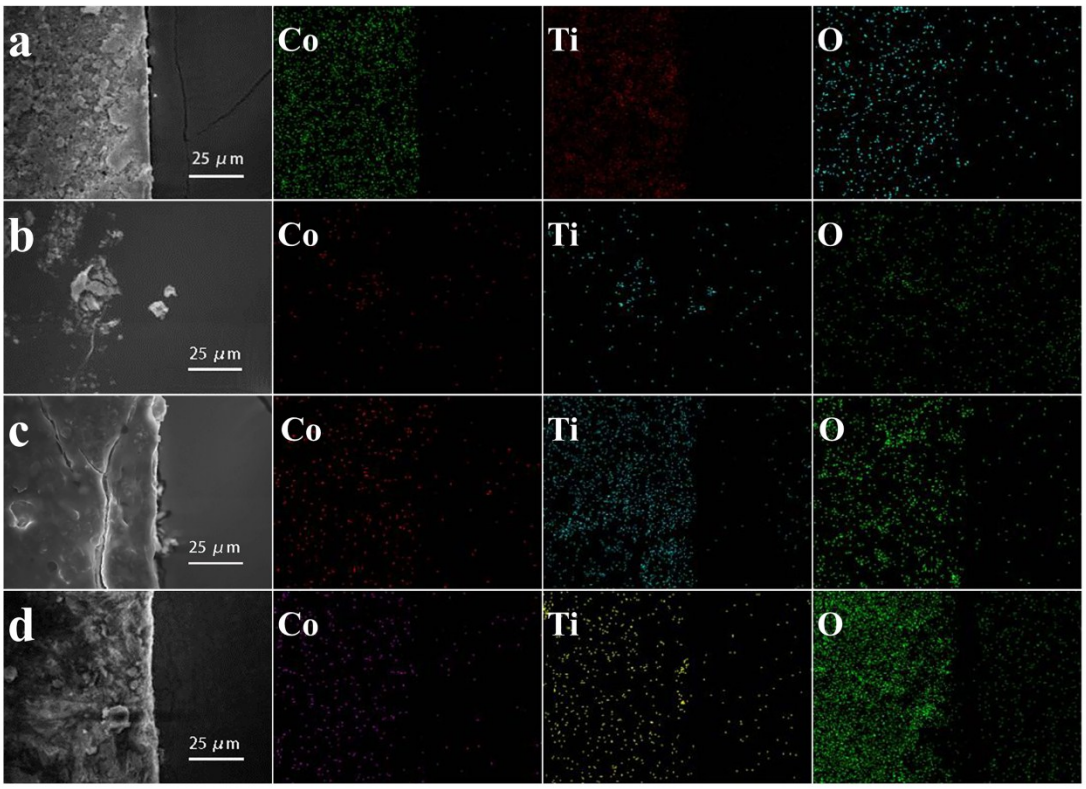

Figure S10. SEM images and corresponding elemental mappings of $Co_3O_4/Ti_3C_2T_x$-3 electrodes at initial (a) and after (b) 50, (c) 300 and (d) 900 cycles.