Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

2D Co-doped $MnCr_2O_4$ nanosheets as efficient bifunctional cathode materials for Long-Life Li-O_2 batteries

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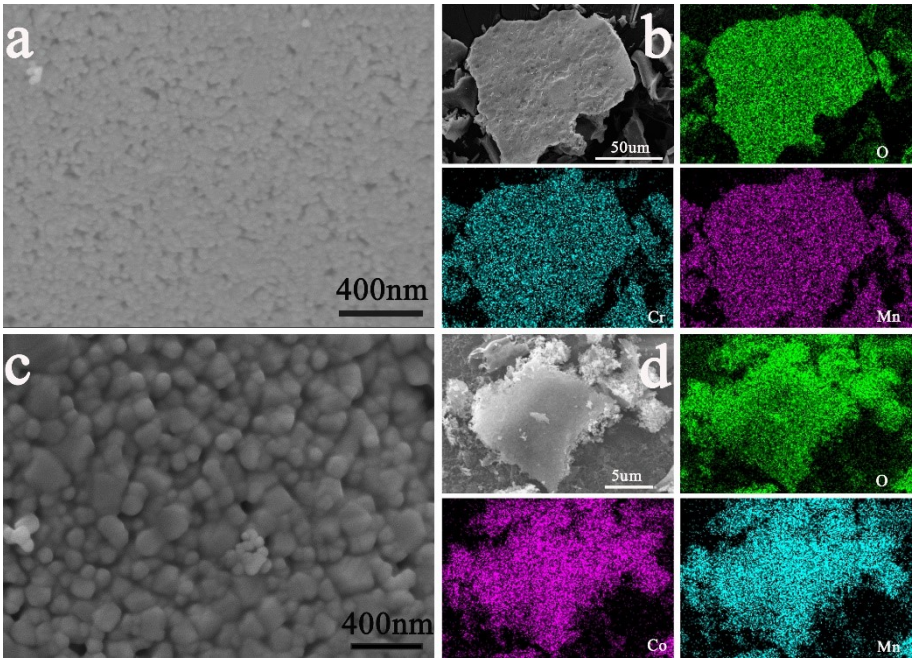

Fig. S1. (a, b) MnCrO and (c, d) MnCoO sample surface morphologies at high magnification and Mapping images.

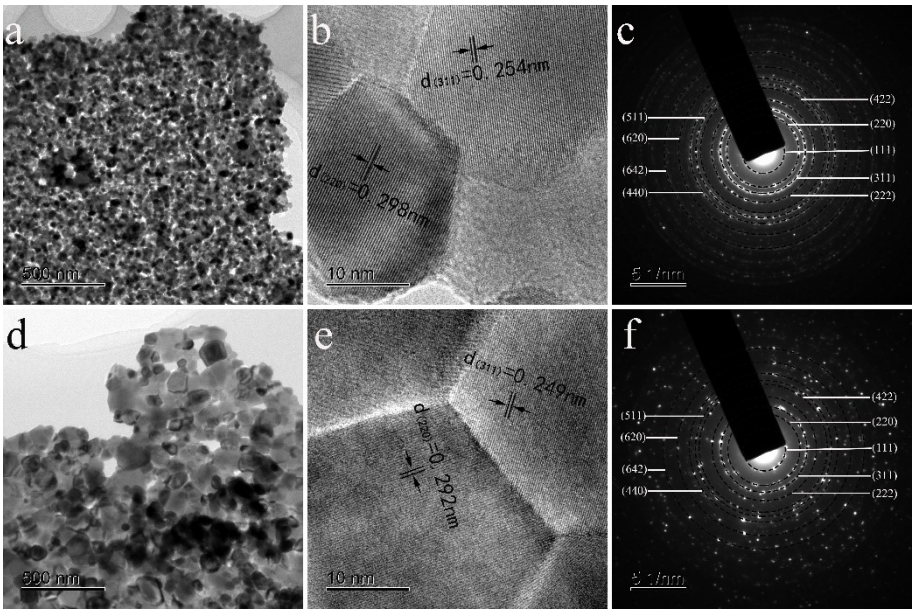

Fig. S2. (a-c) TEM, HRTEM images and electron diffraction patterns of MnCrO, respectively; (d-f) TEM, HRTEM images and electron diffraction patterns of MnCoO, respectively.

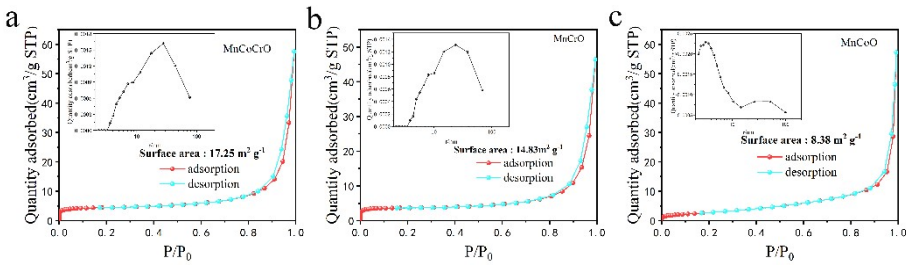

Fig. S3. N_2 adsorption and desorption isotherms and pore size distribution curves (inset) of (a) MnCoCrO, (b) MnCrO and (c) MnCoO.

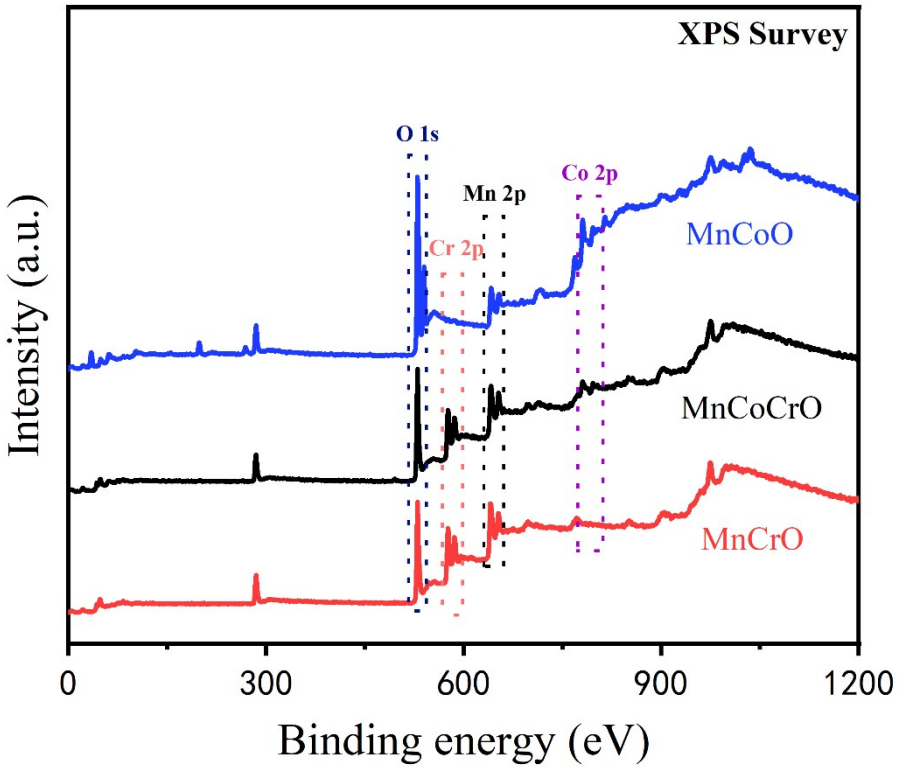

Fig. S4. XPS survey spectrum of MnCoCrO, MnCrO and MnCoO.

Table S1. Atomic surface concentration of MnCrO and MnCoCrO catalysts obtained with XPS.

	Surface atomic concentration (at%)			
Catalysts	Co	Mn	Cr	O
MnCrO	0	10.79	20.98	68.24
MnCoCrO	3.97	10.58	17.93	67.52

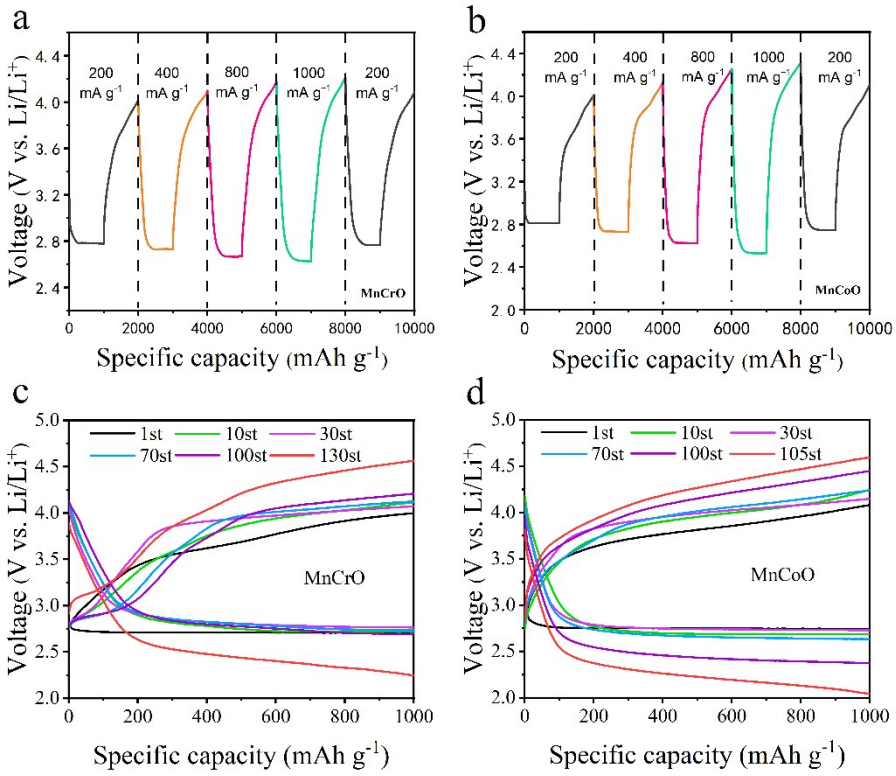

Fig. S5. The discharge–charge profiles of (a) MnCrO, (b) MnCoO-based electrode at various current densities ranging from 0.2 to 1.0 A g^{-1} with a limited capacity of 1000 mAh g^{-1}; Discharge–charge profiles of (c)MnCrO, (d) MnCoO-based electrode with different cycles at 400 mA g^{-1}.

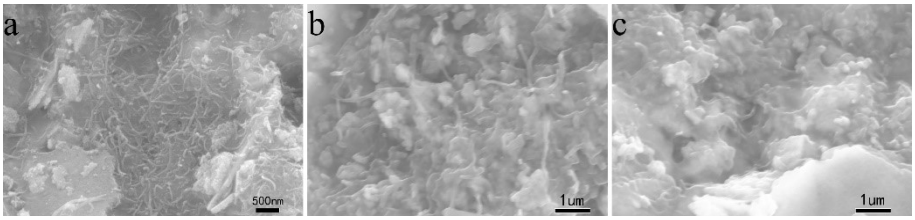

Fig. S6. Ex situ SEM images of recharged (a) MnCoCrO, (b) MnCrO, and (c) MnCoO-based electrodes with different magnifications.

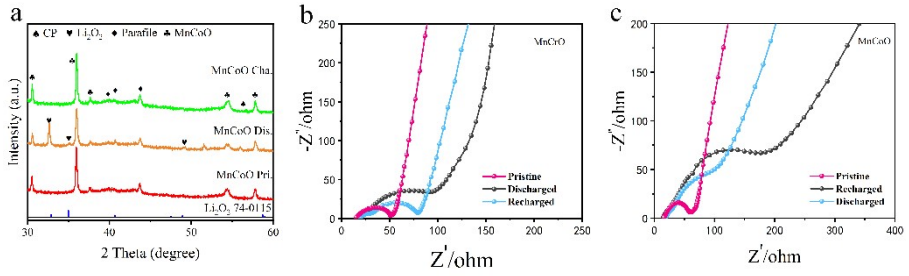

Fig. S7. (a) Ex-situ XRD patterns of discharged and charged MnCoO electrode; Nyquist plots of (b) MnCrO and (c) MnCoO electrodes at different discharge/charge stages.

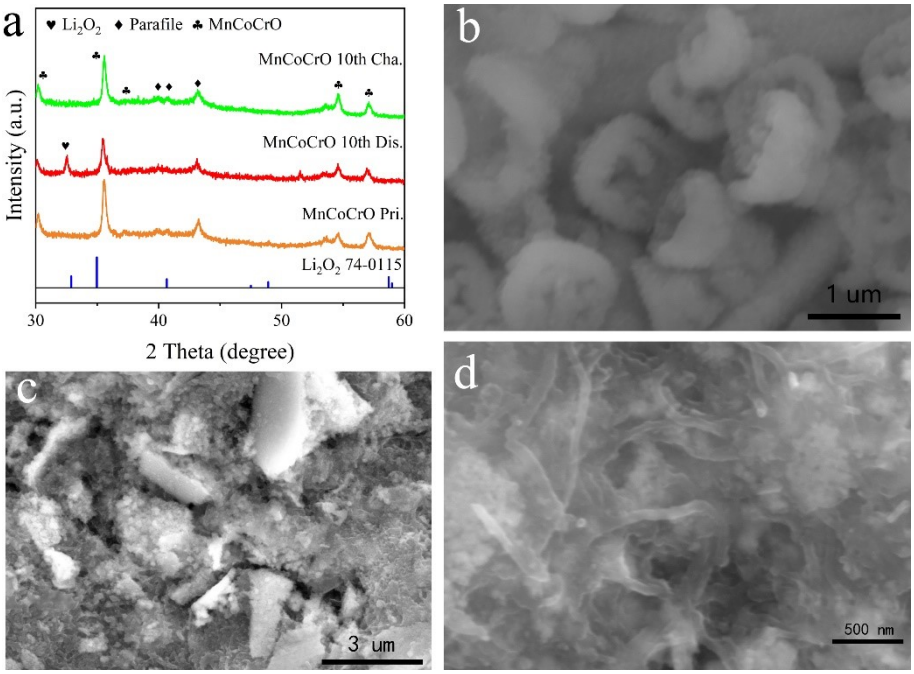

Fig. S8. (a) Ex-situ XRD of 10th cycle for MnCoCrO electrodes; Ex-situ SEM of 10th (b) discharge (c,d) charge for MnCoCrO electrode.

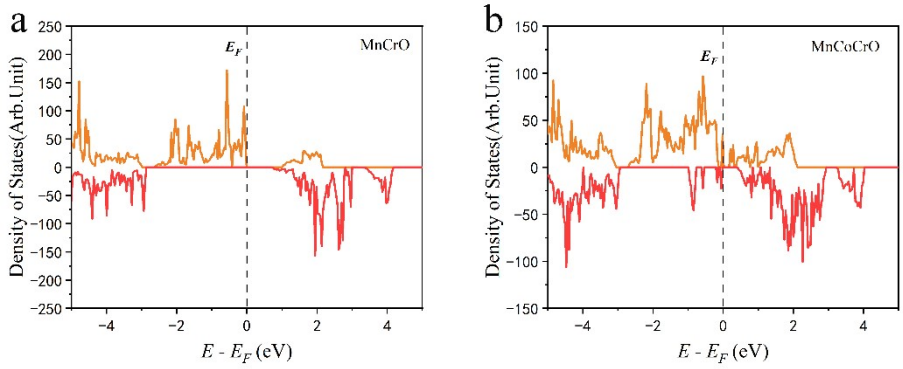

Fig. S9. (a-b) Computed density of states of MnCrO and MnCoCrO.