Supporting Information

Spinel Zinc Cobalt Oxide ($ZnCo_2O_4$) Porous Nanorods as a Cathode Material for Highly Durable Li–CO_2 Batteries

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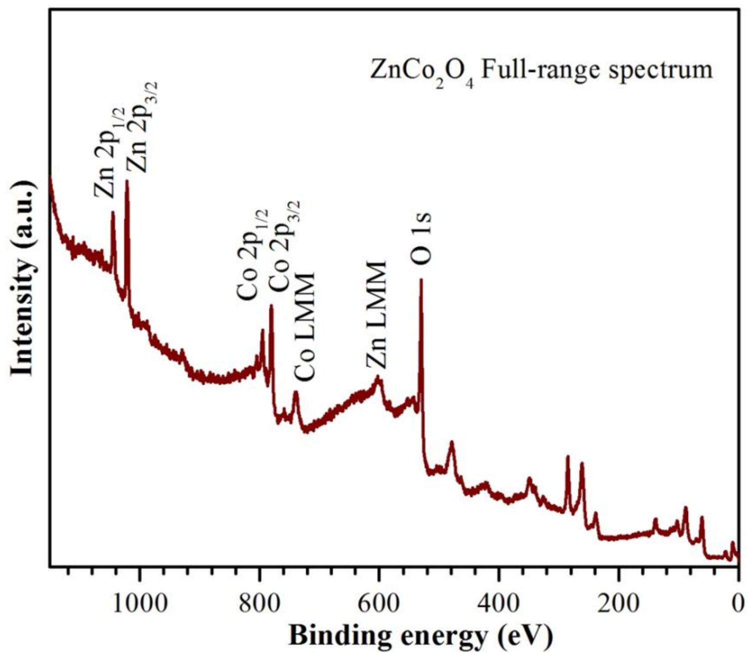

Figure S1. Full-range X-ray photoelectron spectrum of $ZnCo_2O_4$.

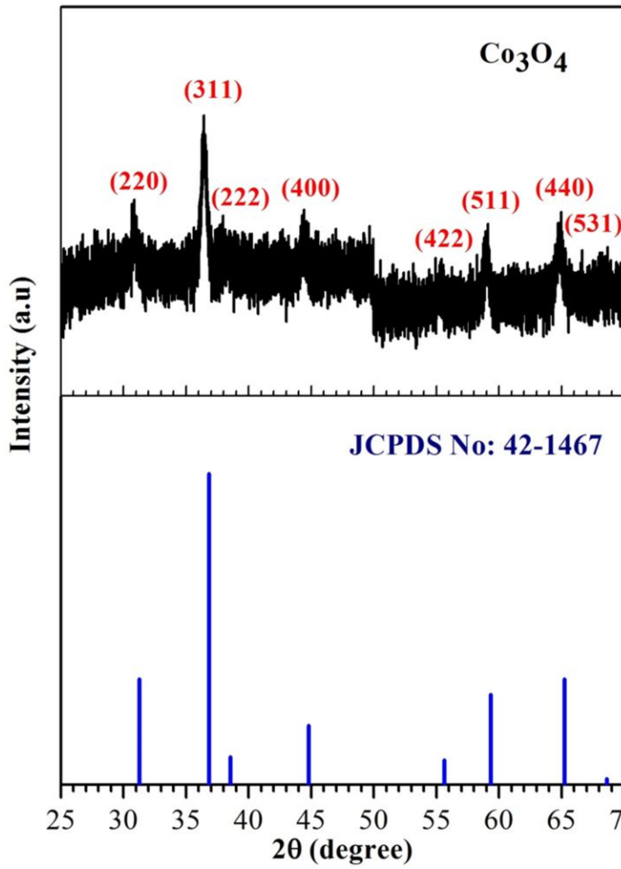

Figure S2. X-ray diffraction pattern of the porous Co_3O_4 nanorods.

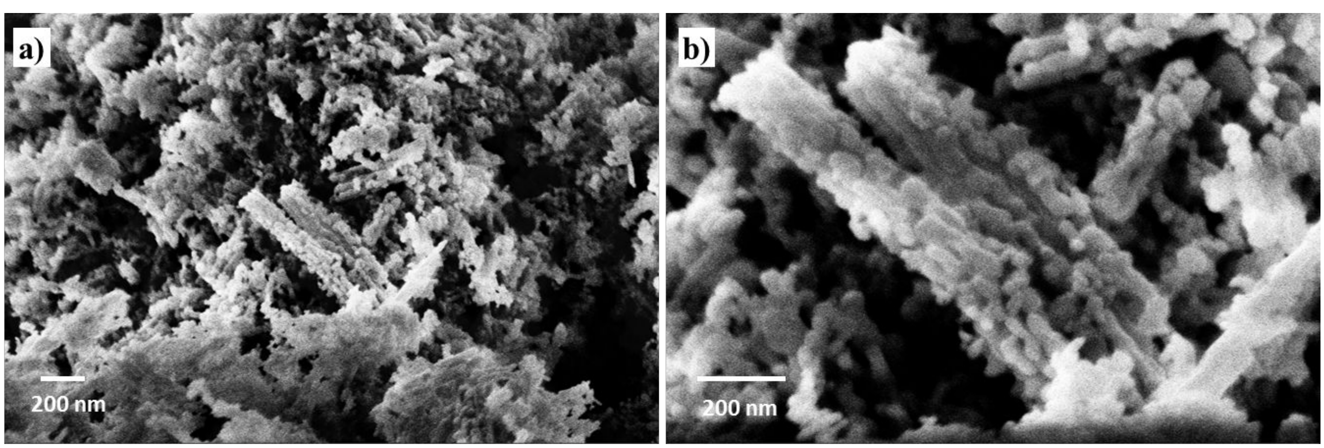

Figure S3. (a) Low- and (b) high-resolution scanning electron micrographs of the as-synthesized porous Co_3O_4 nanorods.

Cathode	Solution resistance Rs/ Ohm	Charge transfer resistance Rct/ Ohm
$ZnCo_2O_4$@CNT	10.22	2413
Co_3O_4@CNT	12.35	2904

Table S1. Solution and charge transfer resistance values obtained from the Nyquist plot fitting curves of $ZnCo_2O_4$@CNT and Co_3O_4@CNT.

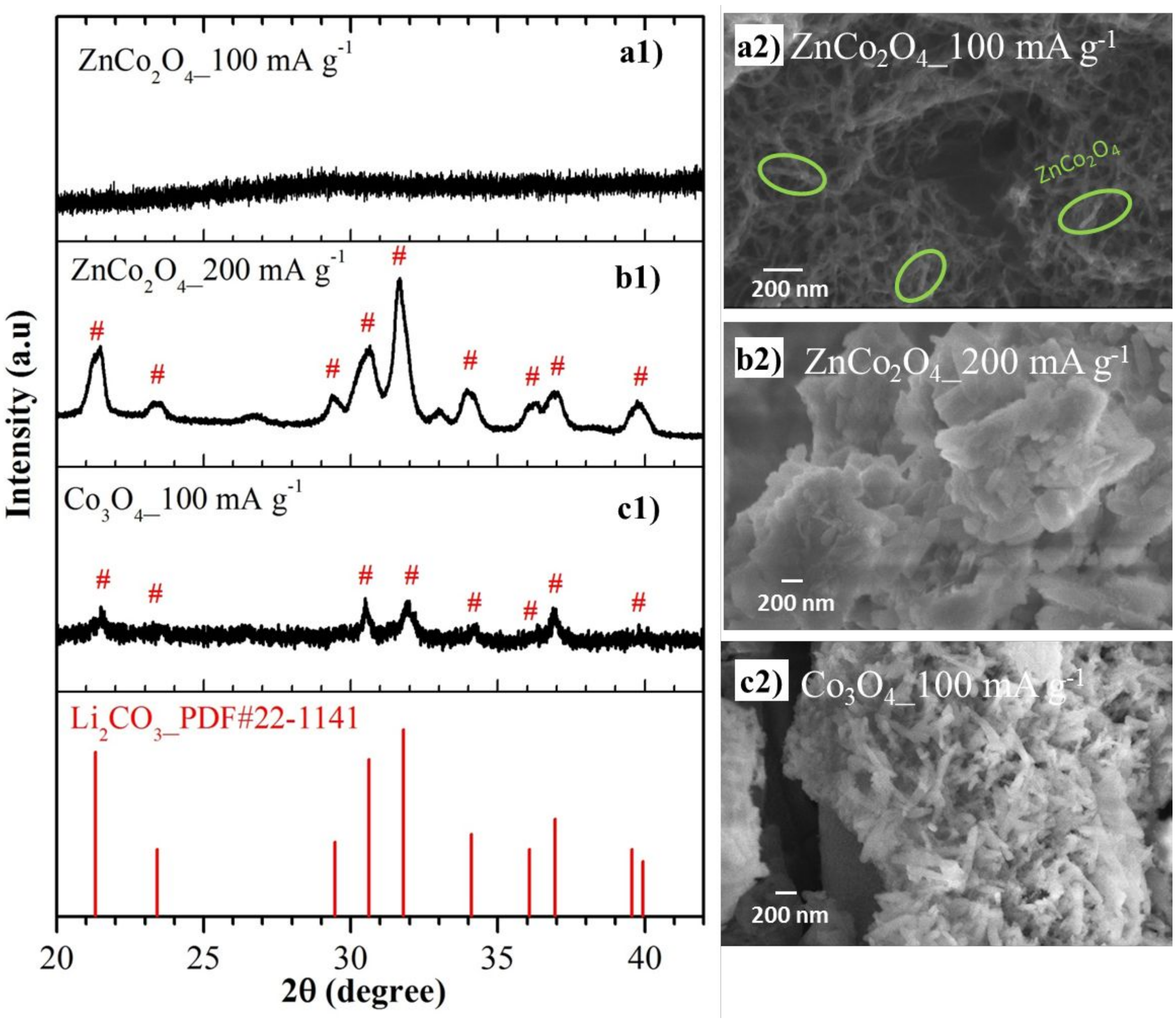

Figure S4. X-ray diffraction patterns and corresponding SEM images of $ZnCo_2O_4$@CNT cathode at (a1, a2) 100 mA g^{-1} and (b1, b2) 200 mA g^{-1}.after the end of battery cycles test. c1, c2) X-ray diffraction pattern and corresponding SEM image of Co_3O_4@CNT cathode at 100 mA g^{-1}.after the end of the battery cycles test.

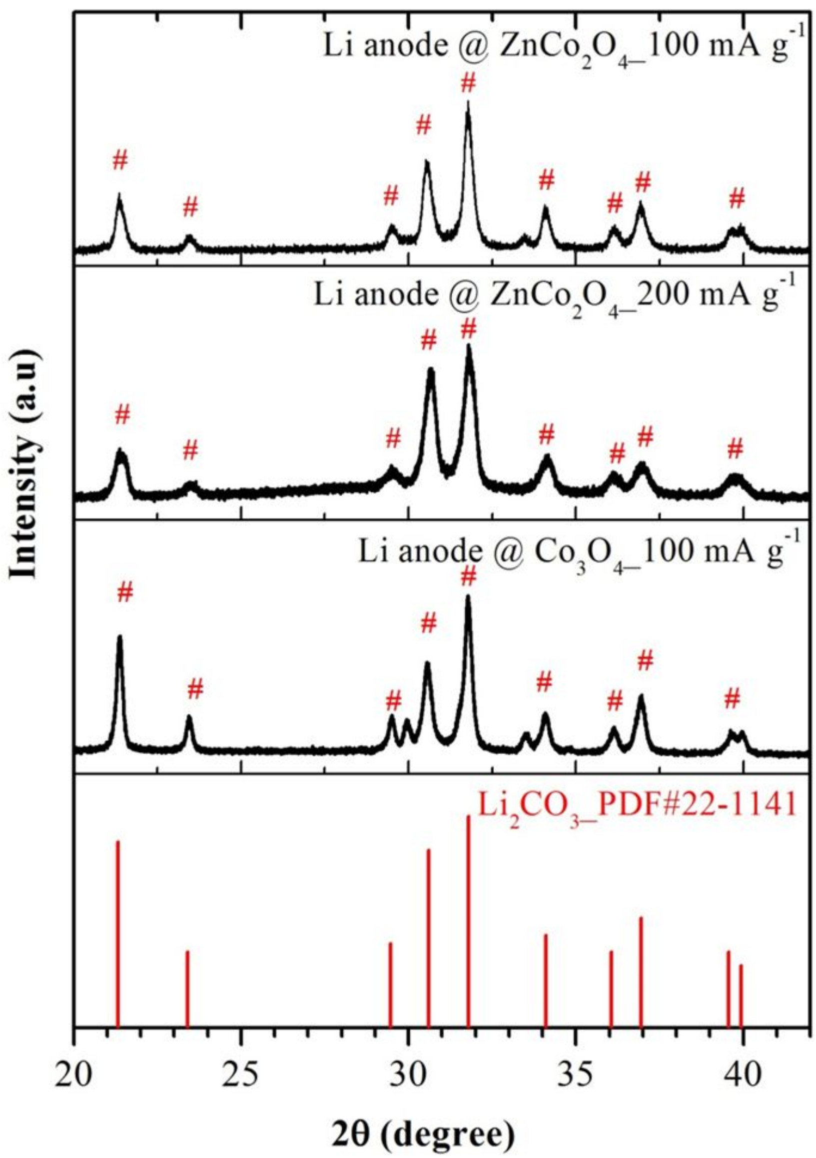

Figure S5. X-ray diffraction patterns of the Li anodes while using $ZnCo_2O_4$@CNT and Co_3O_4@CNT cathodes after the battery cycle test.

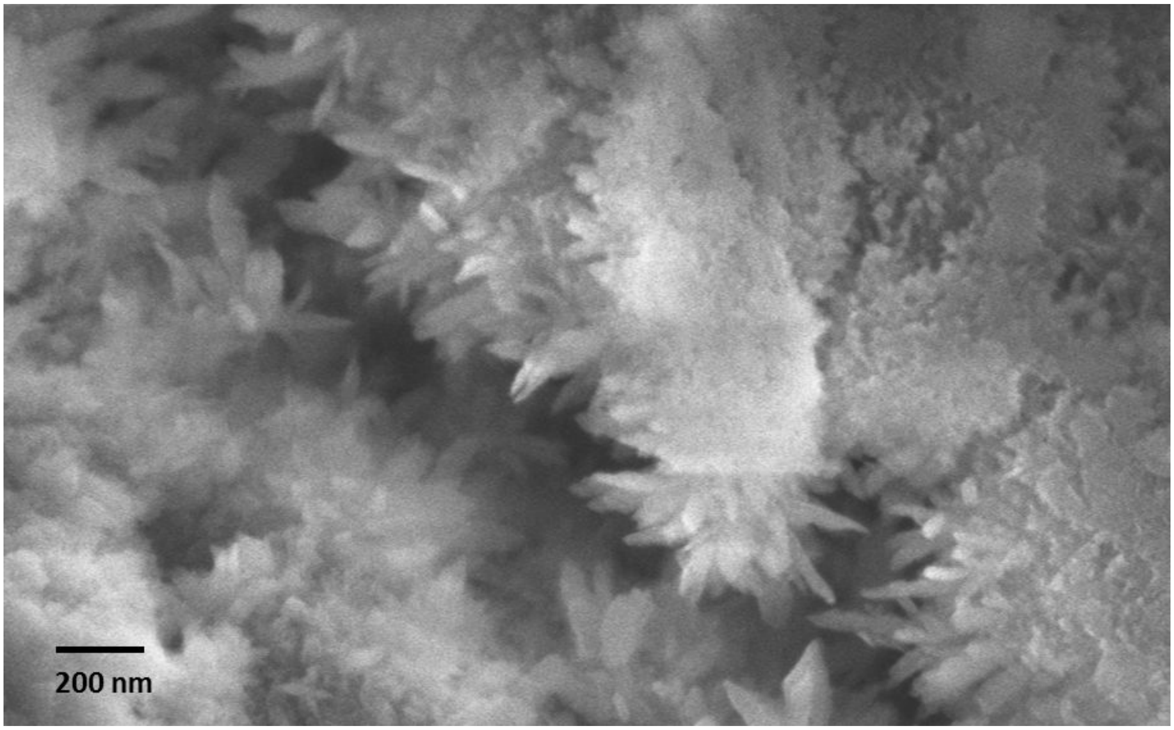

Figure S6. Cross-sectional scanning electron micrograph of the Li anode after the end of the cycle test by utilizing $ZnCo_2O_4$@CNT as the cathode in a Li–CO_2 battery at a current density of 100 mA g^{-1}.

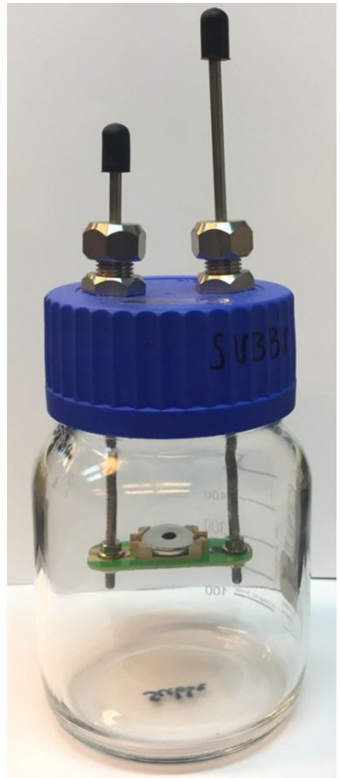

Figure S7. Specially designed gas bottle used for the battery cycle test.

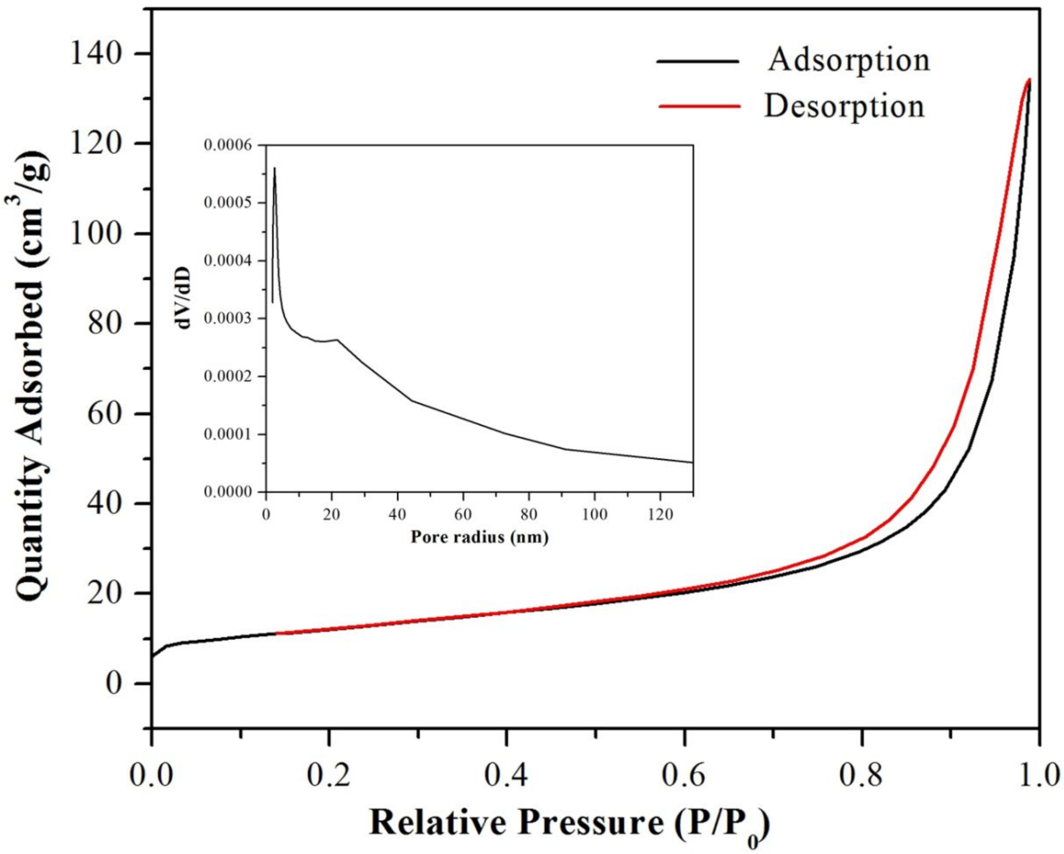

Figure S8. N_2 adsorption–desorption isotherms of $ZnCo_2O_4$ nanorods. The inset represents the pore size distribution of the $ZnCo_2O_4$ nanorods.

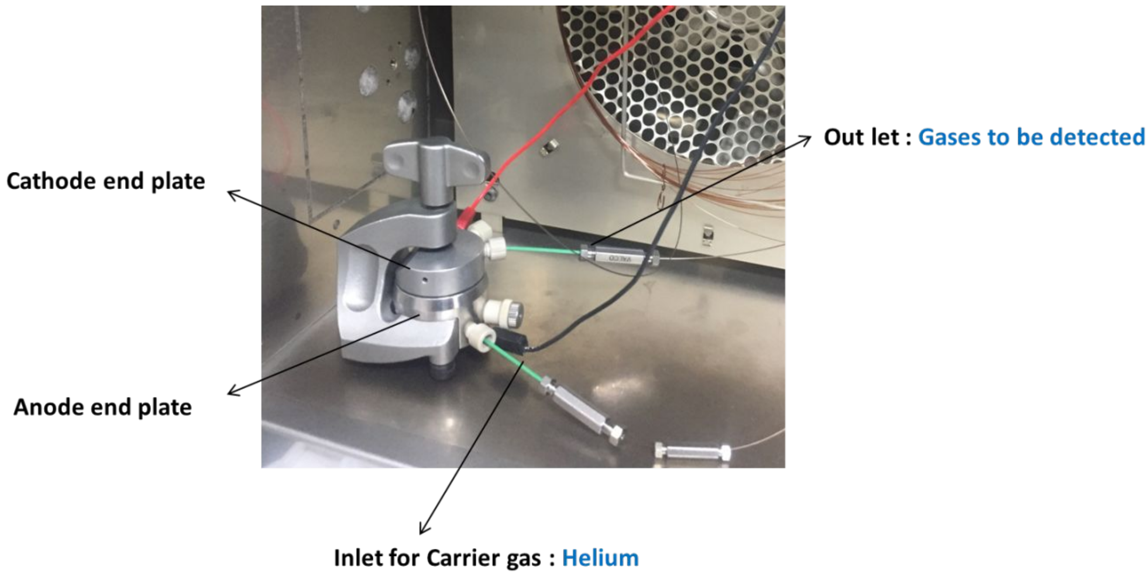

Figure S9. Photograph of the homemade cell for *in-situ* GC-MS characterization of the charging process of $ZnCo_2O_4$@CNT cathode based Li–CO_2 cell.