Electronic Supplementary Information

**Oxygen Vacancies Derived Local Build-In Electric Field in Mesoporous Hollow Co$_3$O$_4$ Microspheres Promotes High-Performance Li-Ion Batteries**

Chuanxin Hou$^a$, Yue Hou$^a$, Yuqi Fan$^b$, Yanjie Zhai$^a$, Yu Wang$^a$, Zhongyu Sun$^a$, Runhua Fan$^{a,c}$, Feng Dang$^a$, Jun Wang$^a$

$^a$Key Laboratory for Liquid-Solid Structural Evolution and Processing of Materials (Ministry of Education), Shandong University, Jinan 250061, China

$^b$Institute of Environment and Ecology, Shandong Normal University, Wenhuadong Rd 88, Lixia District, Ji’nan, 250014, China.

$^c$College of Ocean Science and Engineering, Shanghai Maritime University, Shanghai 201306, China
Fig. S1 XRD pattern of the s-CoA, which displays diffraction peaks in accord with those of previously-reported polyols-based metal alkoxides. [Chem. Mater., 2003, 15, 3543]
Fig. S2 SEM images of the s-CoA.
Fig. S3 XRD pattern of the h-CoOH.
Fig. S4 SEM images of the h-CoOH.
Fig. S5 Nitrogen adsorption-desorption isotherm loops of Co@200 (a) and Co@400 (a).
Fig. S6 XPS survey spectra of the as-prepared Co@200 (a), Co@300 (b) and Co@400 (c).
Fig. S7 High-resolution XPS spectra for Co 2p of Co@200 (a), Co@300 (b), and Co@400 (c), and the relationship between the ratio of Co^{2+} to Co^{3+} and the calcination temperature (d).
Fig. S8 SEM images of Co@200 (a, b) and Co@400 (c, d).
Fig. S9 TEM image of Co@300.
Fig. S10 Cyclic voltammetry curves of Co@200 (a) and Co@400 (b) electrodes for the first four cycles at scan rate of 0.2 mV s$^{-1}$. 
Fig. S11 Charge-discharge profiles of Co@300 electrodes at different current densities.
Fig. S12 Cycling performance and coulombic efficiency of Co@200 (a) and Co@400 (b) electrodes at current density of 1.0 A g\(^{-1}\).
Fig. S13 Current responses plotted against different scan rates of Co@300 electrodes at different potentials for cathodic scans (a), and anodic scans (b).