In-situ construction of hierarchical Co/MnO@graphite carbon composites for highly supercapacitive and OER electrocatalytic performances

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**Figure S1.** FTIR spectra of (a) Mn-Co precursor; and (b) the calcined samples.

**Figure S2.** (a, b) SEM images of S-800.
Figure S3. (a) XPS survey; (b) Co 2p; (c) Mn 2p; (d) O 1s and (e) C 1s XPS spectra of S-700.
Figure S4. Charge-discharge profiles at various current densities for (a) Co$_{3}$Mn$_{1-x}$O@GC-350; (b) Co/MnO@GC-600 and (c) Co/MnO@GC-800.

Figure S5. (a) CV curves; (b) charge-discharge profiles at various current densities; (c) Specific capacitances as a function of current density for MnCo PBA precursor.
Figure S6. (a) XRD; (b) CV curves; (c) charge-discharge profiles at various current densities and (d) Specific capacitances as a function of current density of Co@GC-700.

Figure S7. (a–e) Cyclic voltammograms at different scan rates in the region between 1.1 and 1.3 V (vs. RHE) of (a) Co$_2$Mn$_{1-x}$O@GC-350; (b) Co/MnO@GC-500; (c) Co/MnO@GC-600; (d) Co/MnO@GC-700 and (e) Co/MnO@GC-800; (f) The differences in current densities ($\Delta j = j_a - j_c$) at 1.21V (vs. RHE) plotted against the scan rates fit to a linear regression.

Figure S8. Electrochemical impedance spectra (EIS) of the samples at 0.4 V vs Ag/AgCl in 1 M KOH solution.
**Figure S9.** (a) The initial and the 1000th polarization curves of Co/MnO@GC-700 in 1 M KOH solution; (b) XRD of Co/MnO@GC-700 and (c-d) SEM images after long-term OER reaction.