Supplementary Information

High-efficiency CuO-CB6/Co-Al LDH nanocomposite electrode for next-generation energy storage

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Section S1

The equations utilized for the calculation of specific capacitance, energy, and power density.

The specific capacitance, Energy density, and power density for the three electrodes as reported in the previous reports [DOI: 10.1039/c3ta15046a] as follows:

Specific capacitances derived from galvanostatic tests can be determined from the equation:

$$C = \frac{I\Delta t}{m\Delta V}$$

where I is the discharging current, t is the discharge time, ΔV is the potential drop during discharge, and m is the mass of active material in the working electrode.

Energy density (E) and power density (P) derived from galvanostatic tests can be estimated from the following equations:

$$E = \frac{C(\Delta V)^2}{8}$$

$$P = \frac{E}{\Delta t}$$

where E, C, ΔV, P, and Δt are the specific energy, specific capacitance, potential window, specific power, and discharge time, respectively.

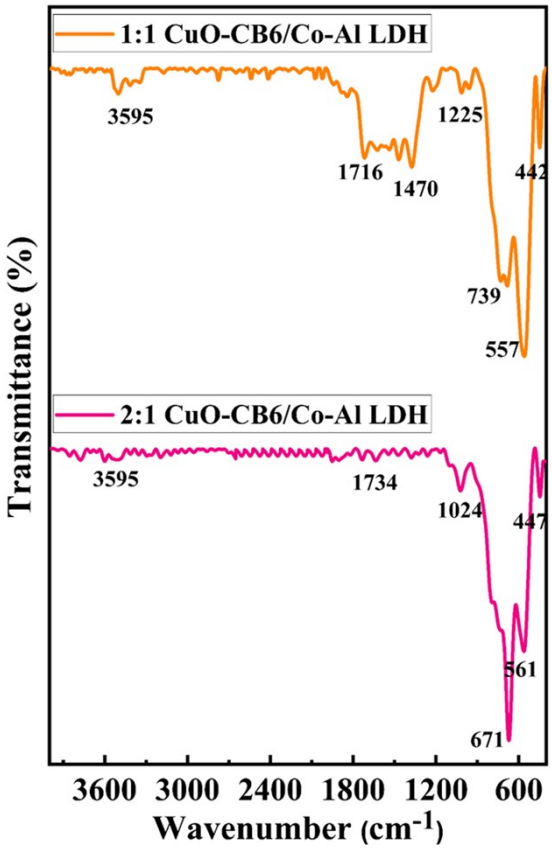

Fig. S1 FT-IR spectra of 1:1 CuO-CB6/Co-Al LDH and 2:1 CuO-CB6/Co-Al LDH.

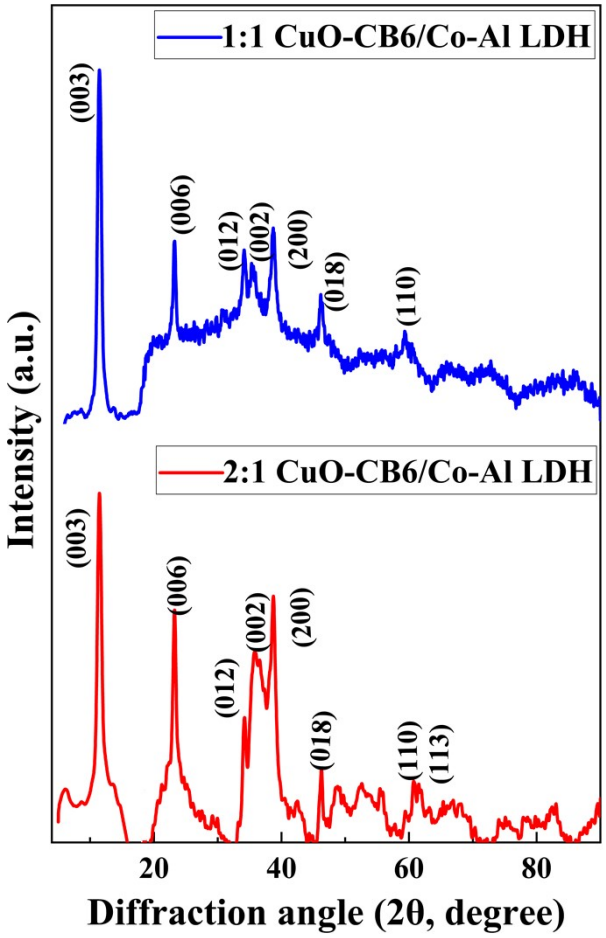

Fig. S2 XRD patterns of 1:1 CuO-CB6/Co-Al LDH and 2:1 CuO-CB6/Co-Al LDH.

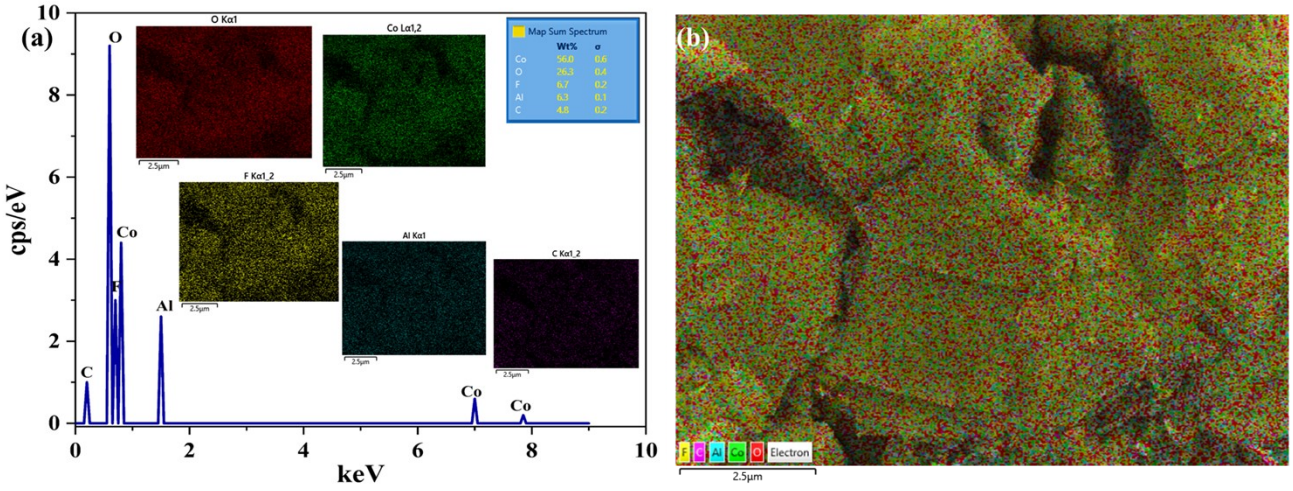

Fig. S3 (a) EDX spectrum with elemental mapping analysis and (b) EDS layered images of Co-Al LDH.

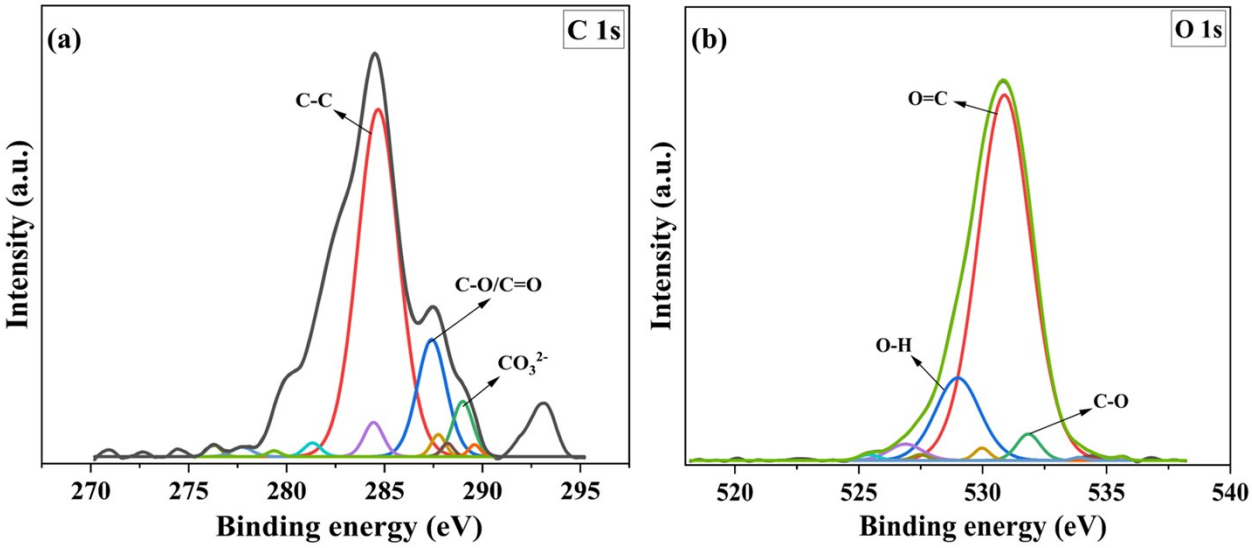

Fig. S4 XPS deconvolution spectra of 1:2 CuO-CB6/Co-Al LDH nanocomposite of (a) C 1s and (b) O 1s.

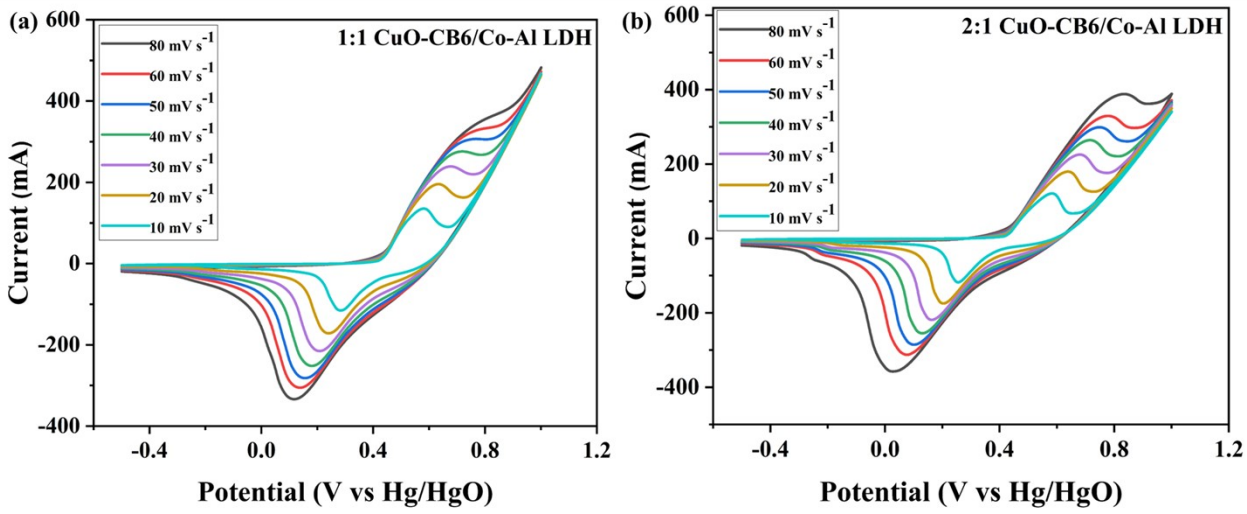

Fig. S5 Cyclic voltammograms of (a) 1:1 CuO-CB6/Co-Al LDH and (b) 2:1 CuO-CB6/Co-Al LDH in 1M KOH at current densities of 80, 60, 50, 40, 30, 20, and 10 mV s^{-1}.

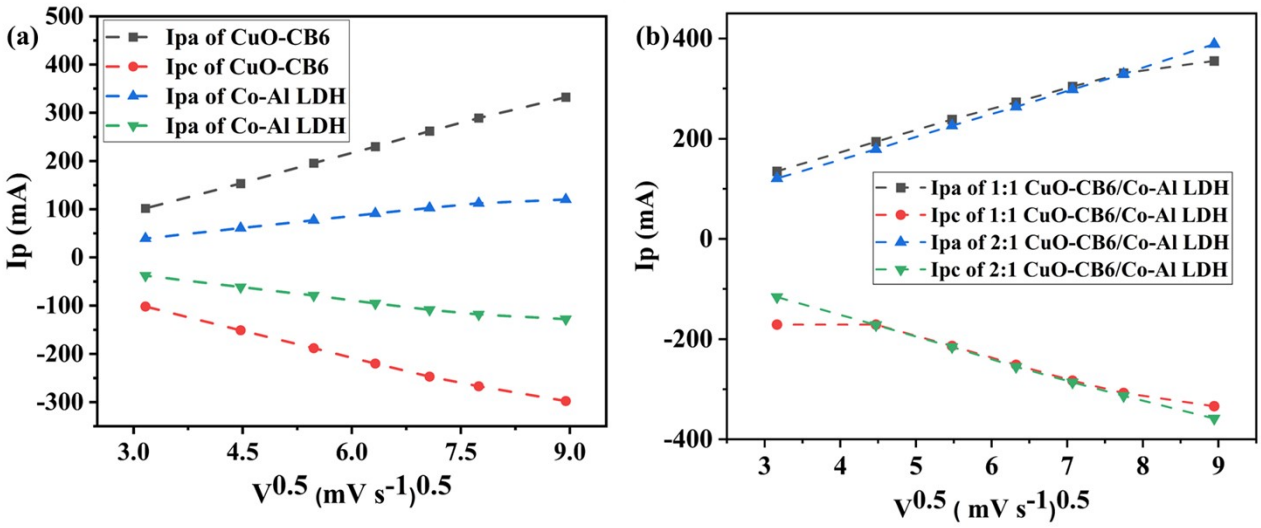

Fig. S6 Randles sevcik plot of (a) CuO-CB6 and Co-Al LDH. (b) 1:1 CuO-CB6/Co-Al LDH and 2:1 CuO-CB6/Co-Al LDH.

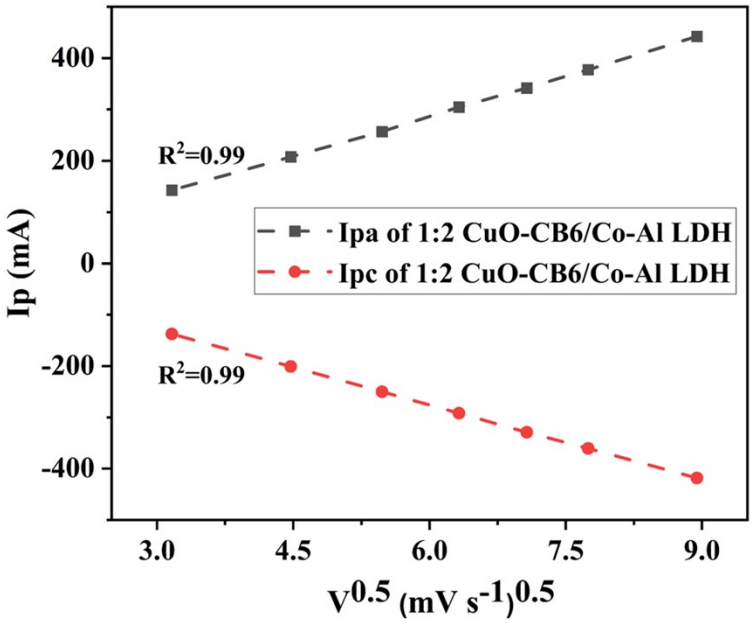

Fig. S7 Randles sevcik plot of 1:2 CuO-CB6/Co-Al LDH.

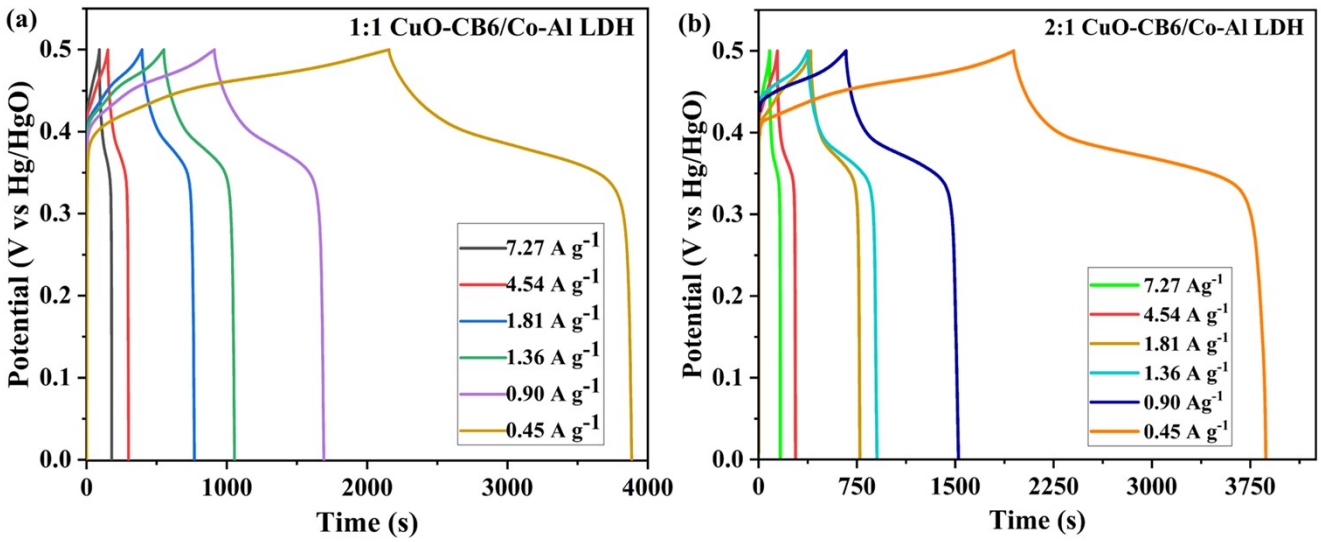

Fig. S8 GCD curves of (a) 1:1 CuO-CB6/Co-Al LDH and (b) 2:1 CuO-CB6/Co-Al LDH nanocomposite in 1M KOH at current density 0.45, 0.90, 3.63, 7.27 A g^{-1}.

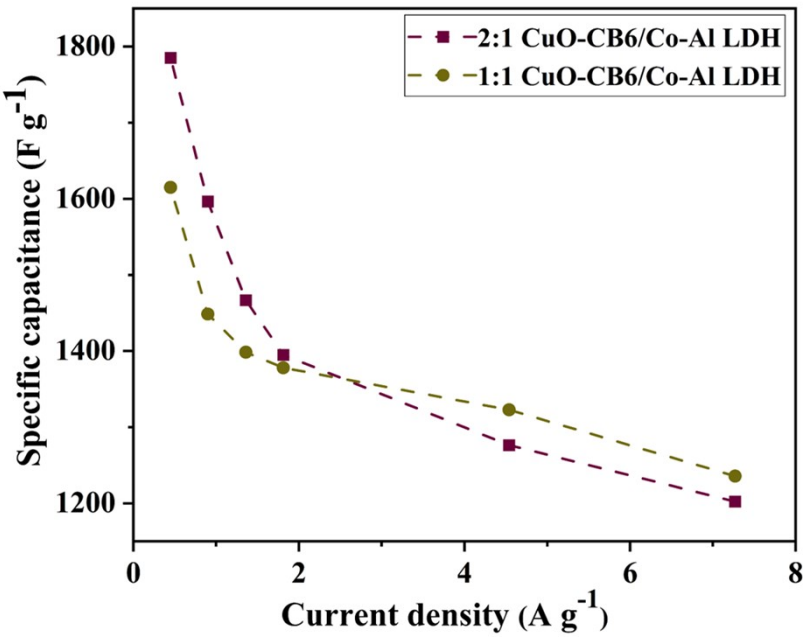

Fig. S9 SC vs. current density plot of 1:1 CuO-CB6/Co-Al LDH and 2:1 CuO-CB6/Co-Al LDH attained from GCD.

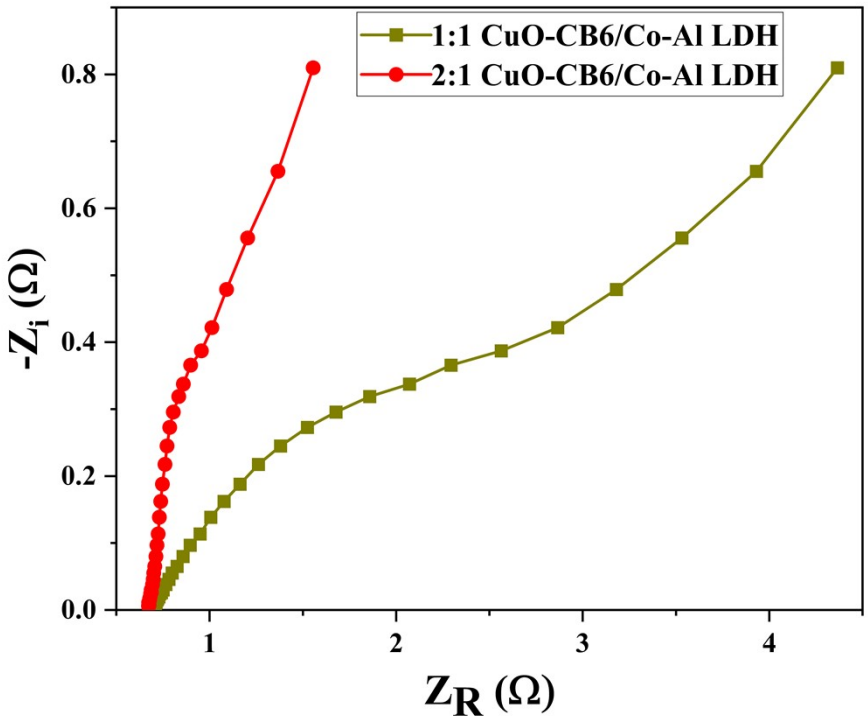

Fig. S10 Nyquist plots of 1:1 CuO-CB6/Co-Al LDH and 2:1 CuO-CB6/Co-Al LDH.

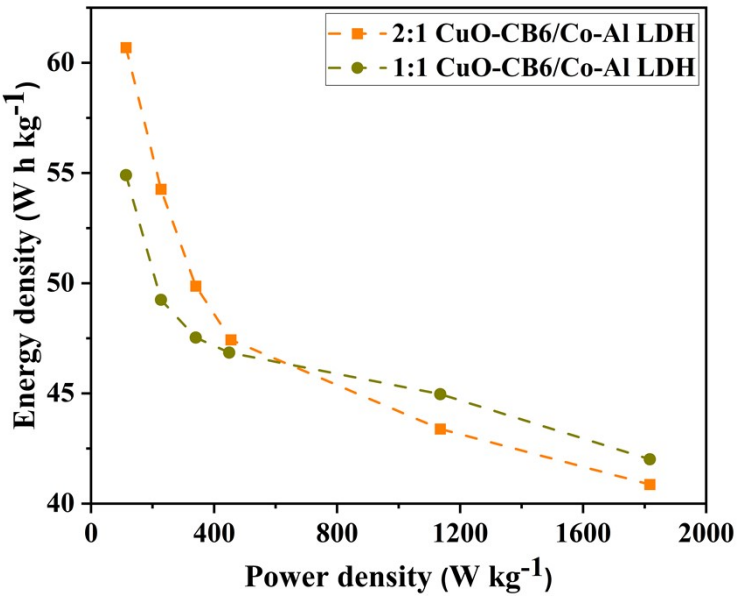

Fig. S11 Ragone plot of 1:1 CuO-CB6/Co-Al LDH and 2:1 CuO-CB6/Co-Al LDH.