Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.


**Supplementary Materials**

# In situ transformation of ZIF-67 into hollow $Co_2V_2O_7$ nanocages on graphene as high-performance cathode for aqueous asymmetric supercapacitors

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**Calculation**

The specific capacity ($Q$) of single electrode can be determined from GCD curves through formula:[1]

$$Q = \frac{I \times \Delta t}{m} \tag{S1}$$

where $\Delta t$, and $I$ are the discharge time, the charge-discharge current, and the potential range excluding IR drop in charge-discharge curves, and $m$ represents the mass loading of the working electrode.

For the ASC device, the mass ration of cathode and anode was determined by equation:[2]

$$\frac{m_+}{m_-} = \frac{Q_-}{Q_+} \tag{S2}$$

where $m$ and $Q$ represents the mass loading and capacity of cathode (+) and anode (-), respectively. The specific capacitance, energy density, and power density of ASC device were calculated by formulas:[3]

$$C_{cell} = \frac{I \times \Delta t}{m \times \Delta V} \tag{S3}$$

$$E = \frac{1}{2} C_{cell} \Delta V^2 \tag{S4}$$

$$P = \frac{E}{\Delta t} \tag{S5}$$

where $C_{cell}$, $\Delta V$, and $\Delta t$ are the corresponding parameters in discharge curves, and $m$ represents the total mass loading of two electrodes in ASC device.

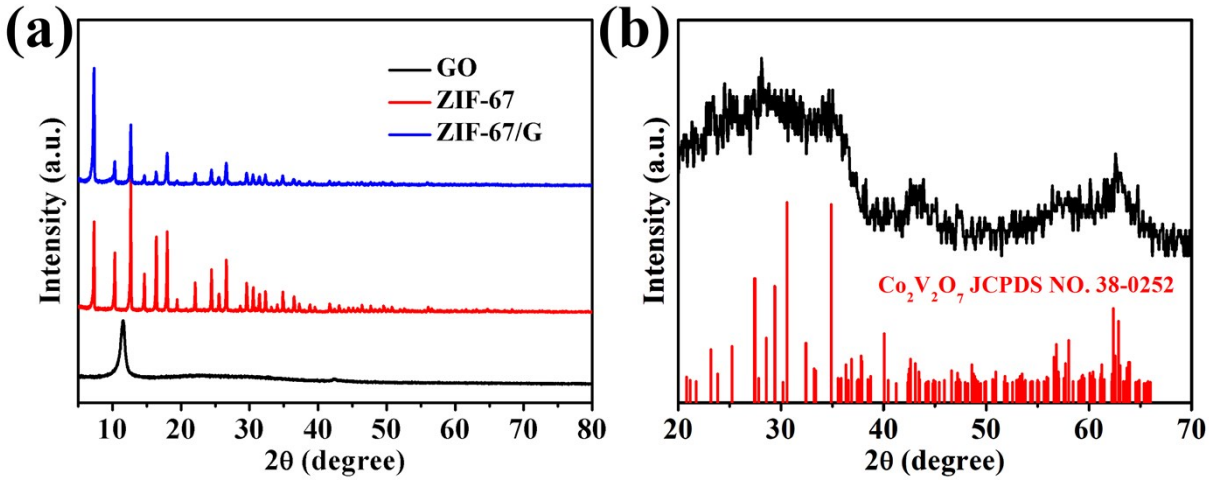


**Fig. S1** (a) XRD patterns of GO, ZIF-67, and ZIF-67/G; (b) XRD patterns of $Co_2V_2O_7$/G.

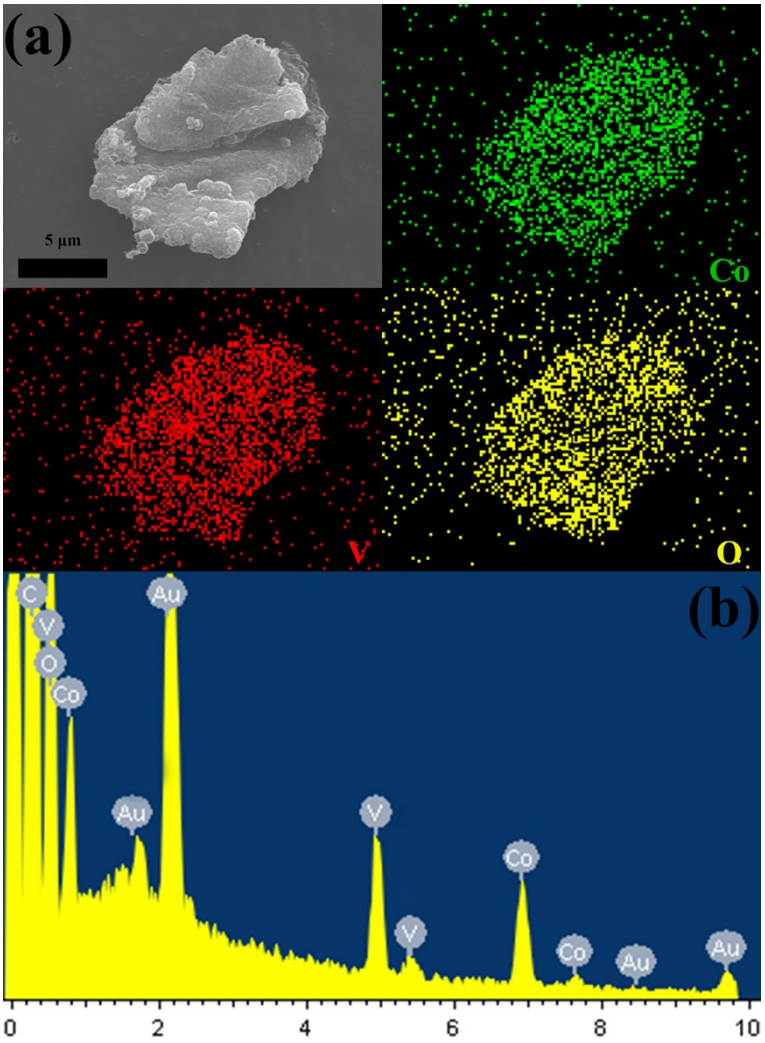


**Fig. S2** (a) elemental mapping image and (b) EDX spectrum $Co_2V_2O_7$/G.

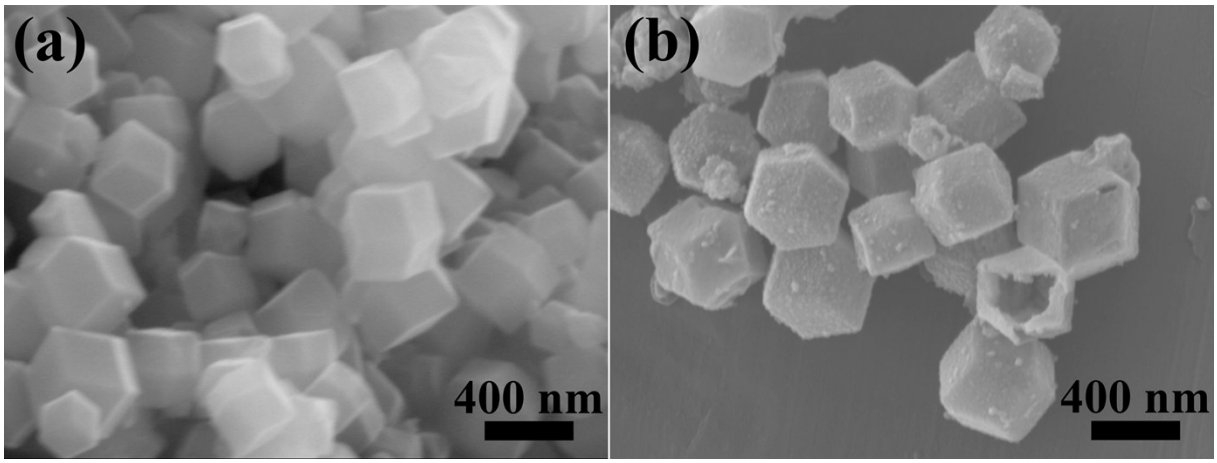


**Fig. S3** SEM of (a) ZIF-67 and (b) $Co_2V_2O_7$.

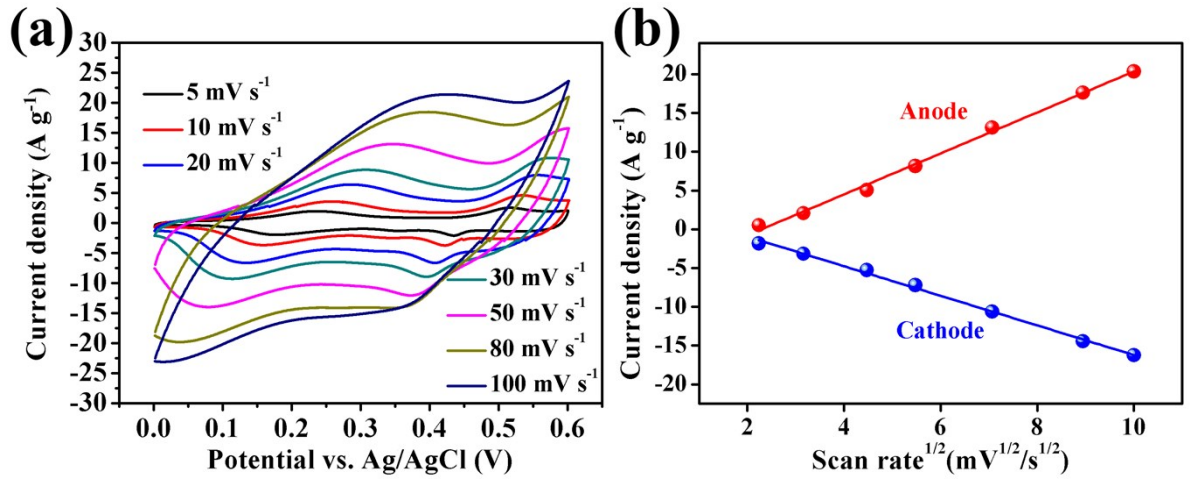


**Fig. S4** (a) CV curves of the $Co_2V_2O_7$ electrode at different scan rates; (b) linear relationship between the anodic/cathodic peak currents at the square root of the scan rates.

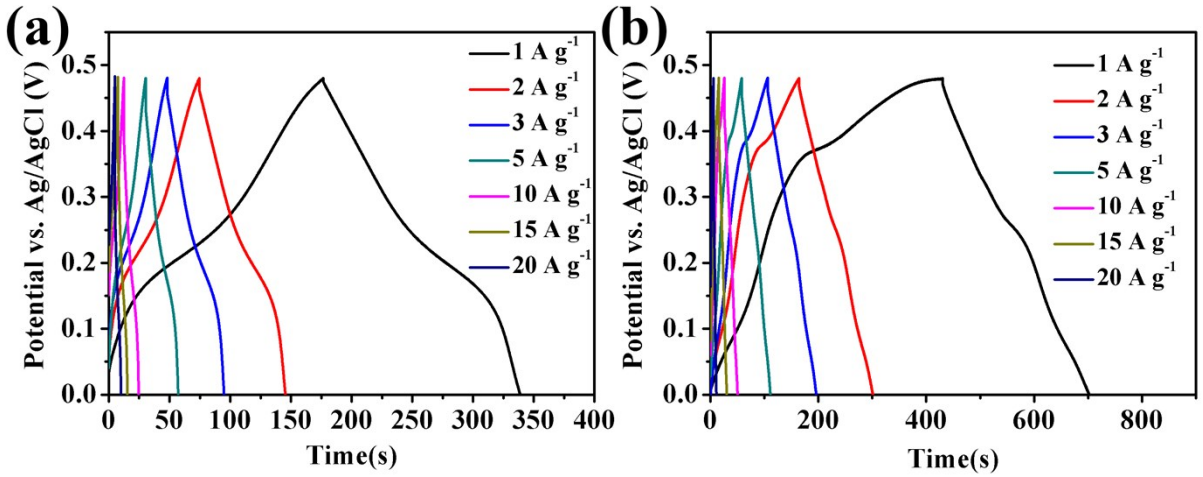


**Fig. S5** GCD curves of (a) $Co_2V_2O_7$ and (b) $Co_2V_2O_7$/G electrodes at different current densities.

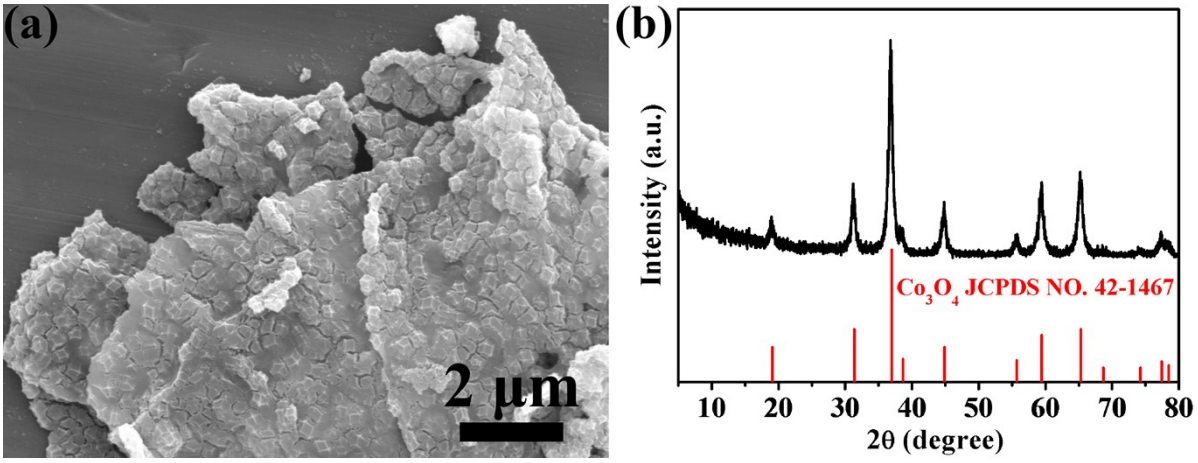


**Fig.S6** (a) SEM and (b) XRD pattern of $Co_3O_4$/G composites.

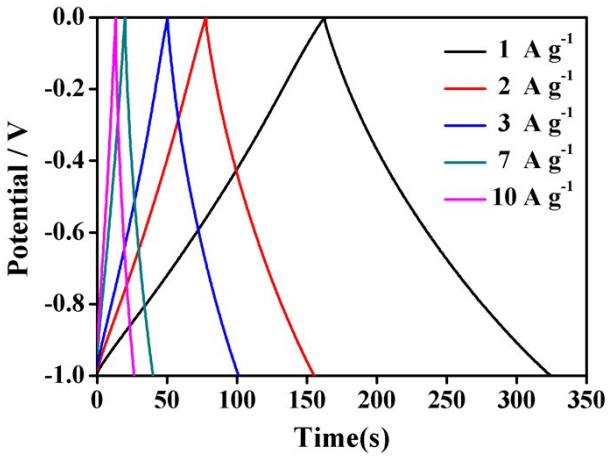


**Fig. S7** GCD curves of rGO electrode at different current densities.

**Reference**

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