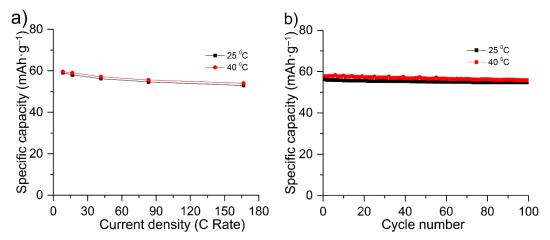1

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Figure S1. Rate performance (a) and cycling performance (b) of **1**$_{frame}$ at different temperatures.
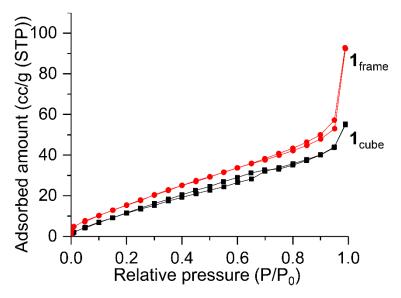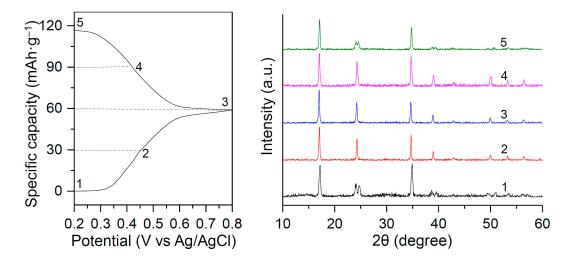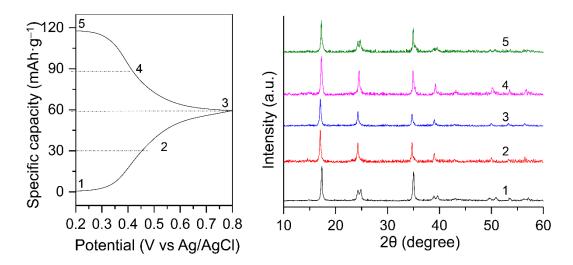
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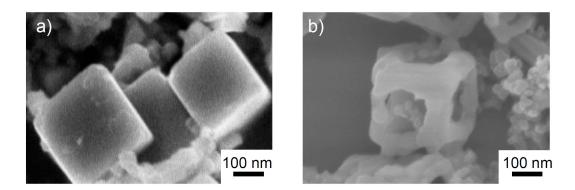**Figure S2.** N_2 adsorption-desorption isotherms of **1** crystals.

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Figure S3. *ex situ* PXRD patterns of the electrochemically actived cubic crystals at charge/discharge during the first cycle at a current density of $0.07 A \cdot g^{-1}$.

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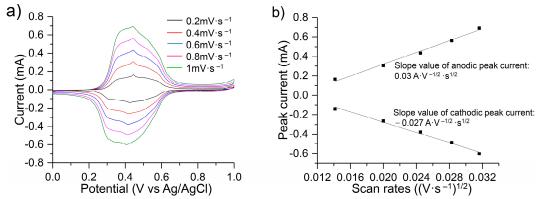55

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Figure S4. *ex situ* PXRD patterns of the electrochemically actived mesoframes at charge/discharge during the first cycle at a current density of 0.07A·g^{-1}.
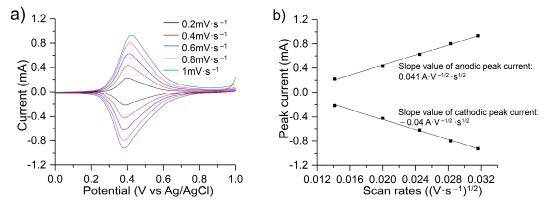
Figure S5. (a) SEM of cubic crystals after cycling. (b) SEM of mesoframes after cycling for 500 cycles.

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99 **Figure S6.** (a) Cyclic voltammetry curves of **1**cube at various scanning rate (b) the anodic and cathodic peak
100 currents as functions of the square root of scanning rates.
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Figure S7. (a) Cyclic voltammetry curves of **1**frame at various scanning rate (b) the anodic and cathodic peak currents as functions of the square root of scanning rates.
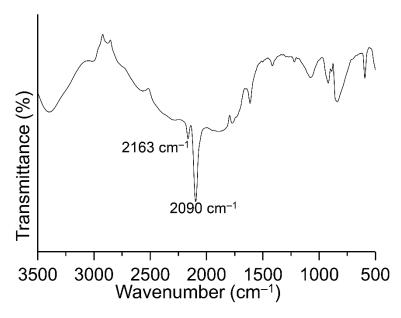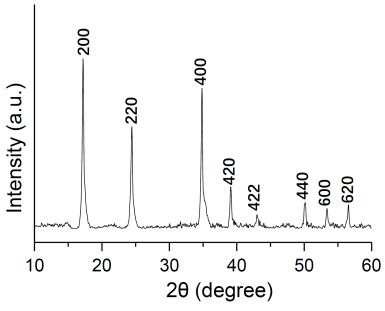
Fig S8. FT-IR Spectrum of mesoframes before electrochemical activation.

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164   **Fig S9.** PXRD patterns of mesoframes before electrochemical activation.