SUPPLEMENTARY INFORMATION

MOF-Derived Micro Structural Interconnected Network Porous Mn$_2$O$_3$/C as the Negative Electrode Material for Asymmetric Supercapacitor Device

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Figure S1: FESEM images of Mn$_2$O$_3$/C samples calcined at 500˚C with the heating rate of 5˚C
Asymmetric supercapacitor device Fabrication:

A coin cell was fabricated using activated carbon as the positive electrode (3.936 mg) and Mn$_2$O$_3$/C as the negative electrode (1 mg). Total mass of the electrode material is 4.936 mg. Whatman filter paper was used as the separator, which had been presoaked in a 1 M Na$_2$SO$_4$ electrolyte for 24 h prior to device fabrication.

Mass balancing for Device fabrication:

The electrode mass ratio should be optimized prior to asymmetric device fabrication

$$\frac{m_+}{m_-} = \frac{C_- X V_-}{C_+ X V_+}$$

where m$_+$ is mass of the positive electrode (activated carbon) (g), m$_-$ is the mass of the negative electrode (g), C$_-$ is the specific capacity of the negative electrode (C g$^{-1}$), V$_-$ is the potential range of the negative electrode (V), C$_+$ is the specific capacity of the positive electrode (C g$^{-1}$), and V$_+$
is the potential range of the positive electrode (V). The optimal mass ratio is \(~0.18\) is the positive to negative electrodes.

Figure S3: (a) CV curve of activated carbon at 25 mVs\(^{-1}\) and (b) Charge discharge curve of activated carbon electrode at 2 A g\(^{-1}\) in aqueous electrolyte
Figure S4: Nyquist plot for asymmetric supercapacitor device after cycling