Supporting Information

A novel ascorbic acid electrochemical sensor based on spherical MOF-5 arrayed on three-dimensional porous carbon electrode

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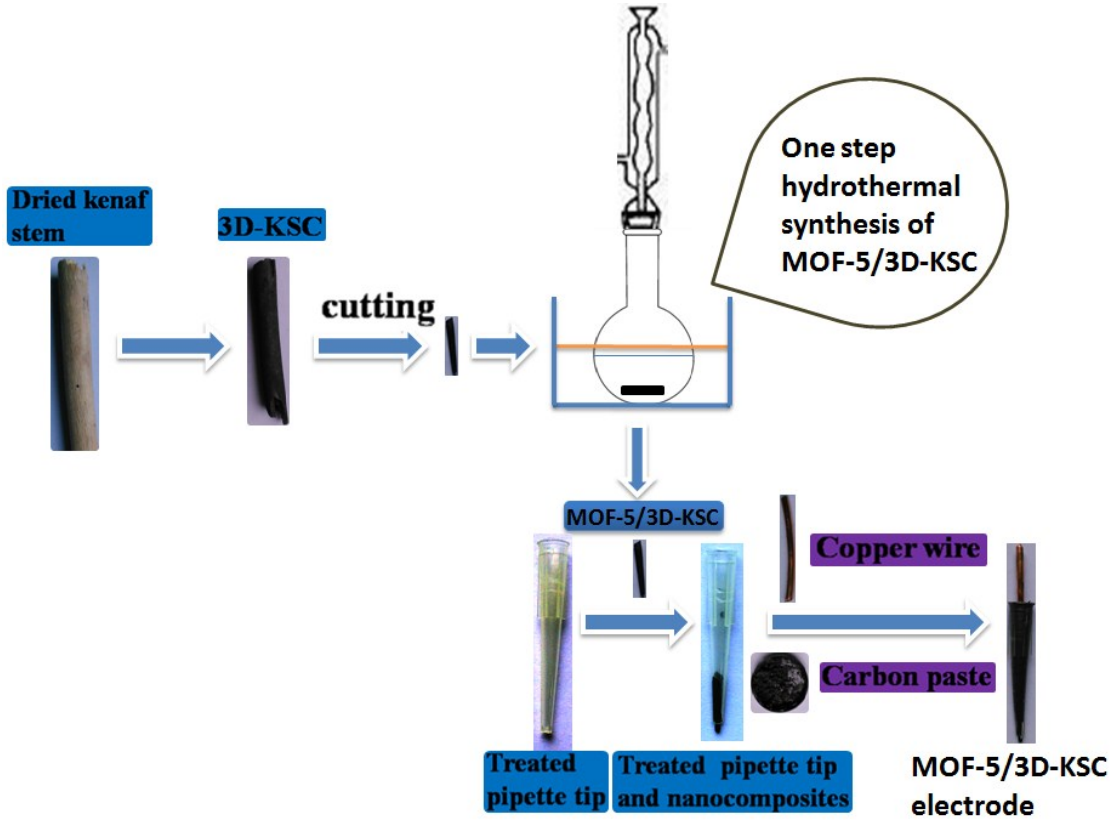

Fig. S1. Schematic illustration of the fabrication of MOF-5/3D-KSC composites and integrated MOF-5/3D-KSC electrode.

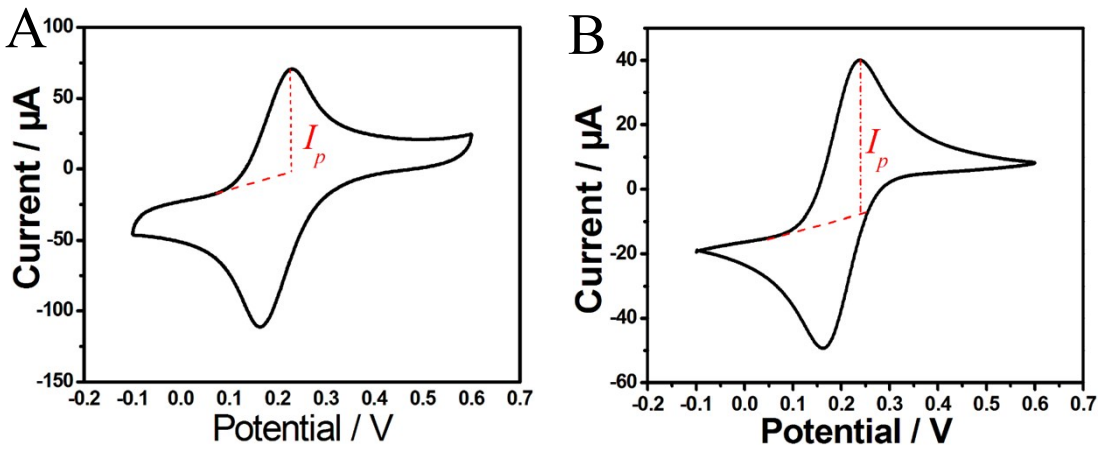

Fig. S2. CVs of GC electrode (A) and integrated MOF-5/3D-KSC electrode (B) in 0.1 M KCl solution containing 5.0 mM $Fe(CN)_6^{3-/4-}$ at 50 mVs^{-1}.

The effective surface areas (A_{eff}) of various GC electrode and integrated MOF-5/3D-KSC electrode were estimated before use based on the CVs in 0.1 M KCl solution containing 5.0 mM $Fe(CN)_6^{3-/4-}$ at 0.05 V s^{-1} according to Randles-Sevcik equation:

$$I_p = 2.69\times10^5 A n^{3/2} D_0^{1/2} v^{1/2} C_0 \quad (1)$$

where n is the number of electrons participating in the redox (n = 1 for $Fe(CN)_6^{3-/4-}$), D_0 is the diffusion coefficient of the molecule in a solution (0.673×10^{-5} cm^2 s^{-1} for $Fe(CN)_6^{3-/4-}$ in 0.1 M KCl solution, C_0 is the bulk concentration of the redox probe (C_0 = 5 mM of the $Fe(CN)_6^{3-/4-}$). As shown in Fig. S1, the I_p was calculated to be 47.66 (A) and 78.35 (B) and accordingly the value of A_{eff} for the GC electrode and integrated MOF-5/3D-KSC electrode was estimated to be 0.0610 cm^2 and 0.1003 cm^2.

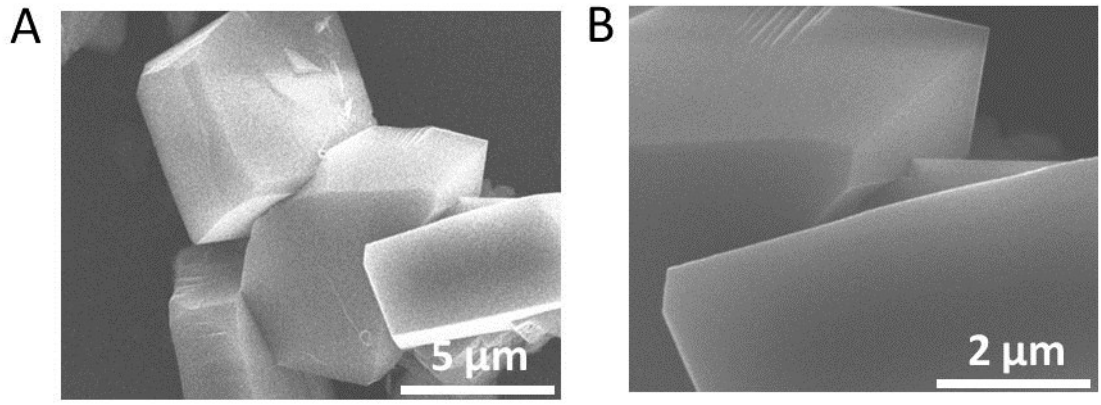

Fig. S3. (A) SEM image of MOF-5. (B) The high magnification image of MOF-5.

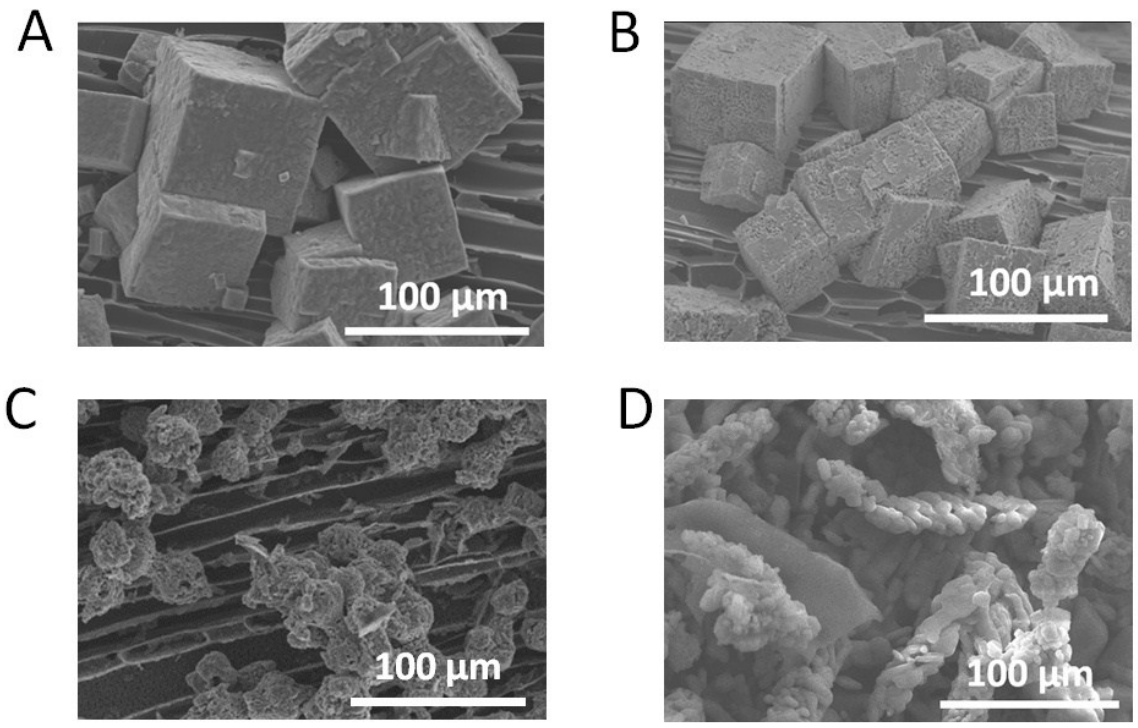

Fig. S4. SEM images of the MOF-5/3D-KSC composites prepared by (A)40 mg ml^{-1} (B) 60 mg ml^{-1} (C) 70 mg ml^{-1} (D) 90 mg ml^{-1} zinc nitrate hexahydrate, and the concentration ratio of zinc nitrate hexahydrate and H_2BDC is 5.45:1.

Table. S1 Determination AA in parenteral nutrient solution samples (N= 5)

NO.	The content (mM)	Added (mM)	Found (mM)	RSD (%)	Recovery (%)	HPLC method (mM)	RSD (%)
1	3.78	3	6.65	2.9	95.7	6.71	1.9
2	3.86	3	6.76	2.8	96.7	6.68	1.7
3	4.05	3	6.91	3.2	95.3	7.11	1.8
4	3.25	3	6.18	2.6	97.6	6.15	1.5