Supporting Information for

Conductive Polymer Coated Scaffold to Integrate 3D Cell Culture with Electrochemical Sensing

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Supporting Information includes Figure S1-S10.

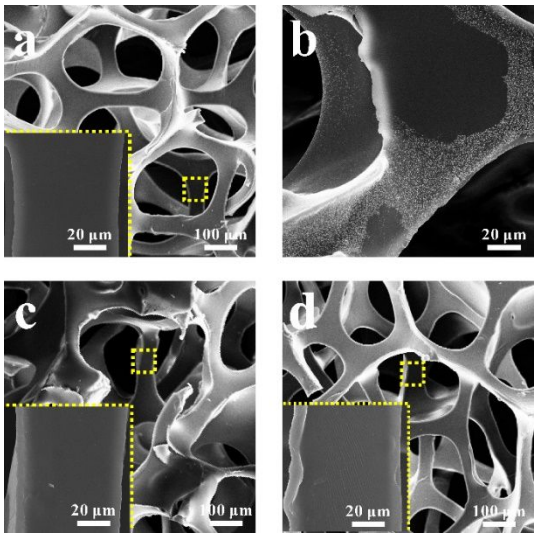

Figure S1. SEM images of (a) PDMS skeleton, (b) heterogeneous Pt NPs on PP/Pt skeleton without CMC modification, (c) PDMS@CMC skeleton and (d) PCP skeleton. Insets show the enlarged SEM images of the yellow rectangle.

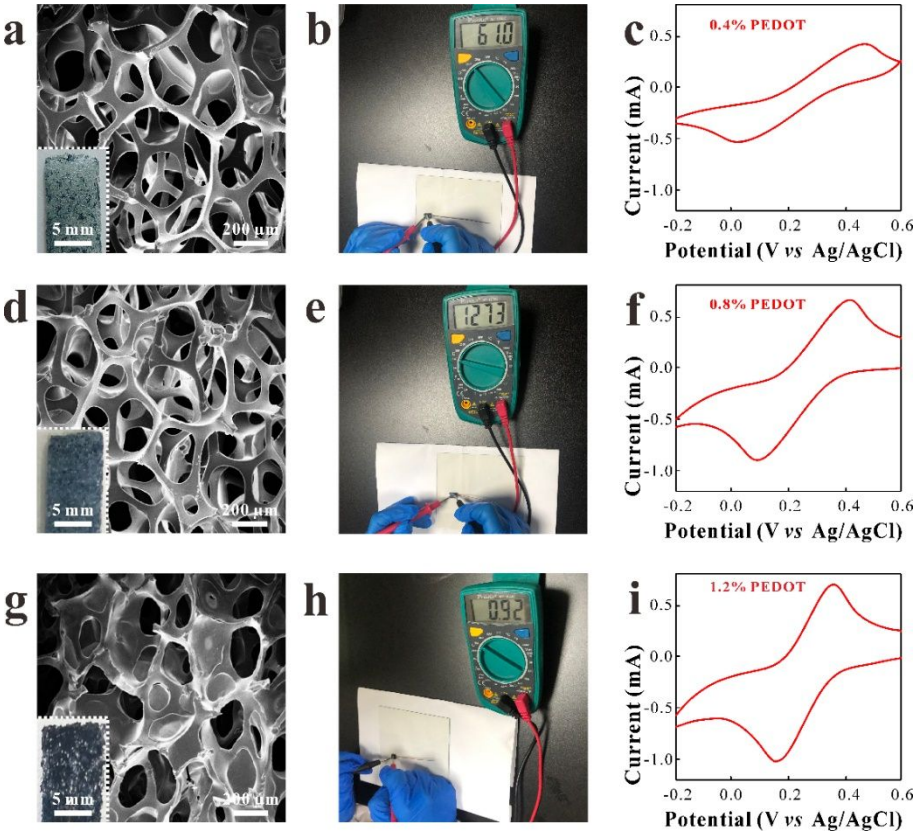

Figure S2. SEM images of PCP skeleton with (a) 0.4% PEDOT, (d) 0.8% PEDOT, (g) 1.2% PEDOT and the insets show the corresponding digital photographs of PCP electrode with different concentrations. Corresponding digital photographs (b, e, h) of resistance measurement and CVs (c, f, i) of PCP electrode obtained in 10 mM $[K_3Fe(CN)_6]^{2+/3+}$ (containing 1 M KCl as supporting electrolyte) at a scan rate of 10

mV/s.

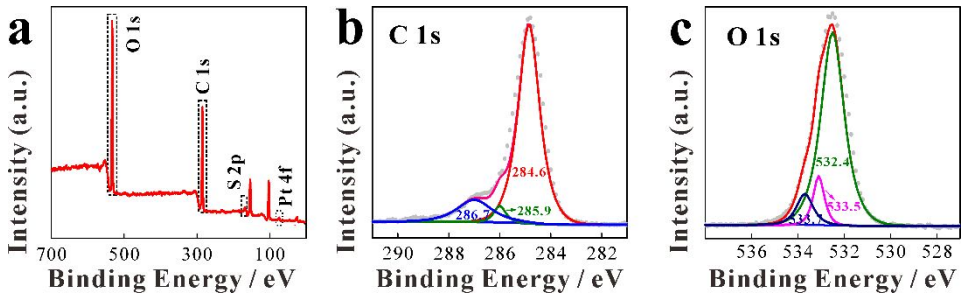

Figure S3. (a) The full XPS spectrum of PCP/Pt. Corresponding spectrums of (b) C 1s states and (c) O 1s states. C 1s spectrum proves the presence of C−O bond (286.7 eV), C−C bond (284.6 eV) and C−S bond (285.9 eV) in PEDOT.[1] The peaks of O 1s spectrum at 533.7 eV were due to the C−O−C bond of PEDOT while the peaks at 532.4 eV and 533.5 eV were due to the S=O bond in PSS and S−OH bond in PSS, respectively.[2]

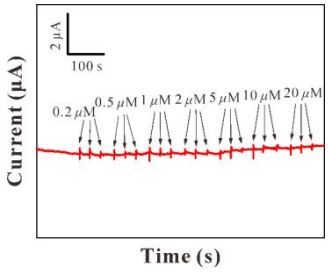

Figure S4. Amperometric response of PCP electrode to a series of increasing H_2O_2 concentration in a stirred, deaerated PBS solution at a potential of +0.50 V (vs Ag/AgCl).

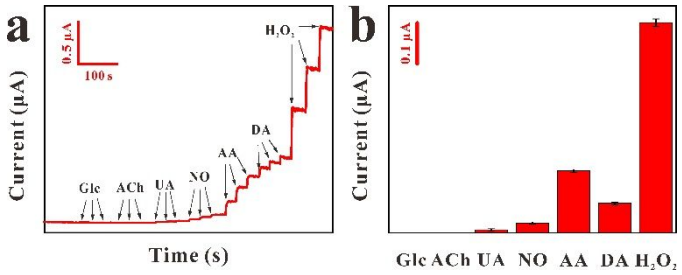

Figure S5. Glucose (Glc), acetylcholine (ACh), uric acid (UA), nitric oxide (NO), ascorbic acid (AA) and dopamine (DA) at the same concentration of 1 μM were chosen as interferences. (a) Amperometric response of PCP/Pt electrode to a series of interferences and H_2O_2 in a stirred, deaerated PBS solution at a potential of +0.50 V (vs Ag/AgCl) and (b) the corresponding comparison diagram of interference detection (n=3). The calculated selectivity ratios for H_2O_2 against UA, NO, AA and DA were 68,

21, 3, and 7.

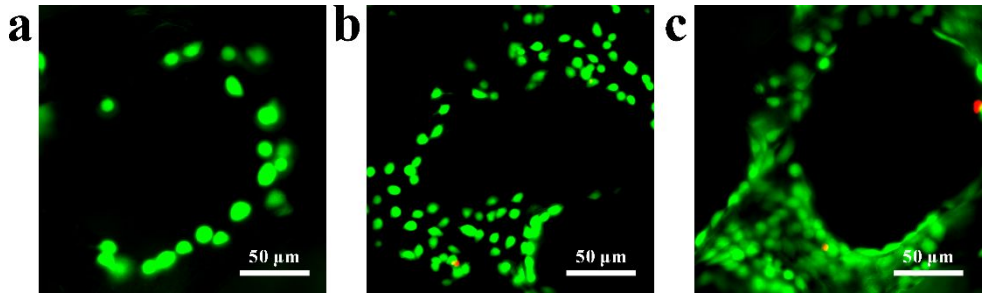

Figure S6. Fluorescent images of HeLa cells cultured on PCP/Pt composites for (a) 24 h, (b) 72 h, and (c) 7 days and labeled with Calcein-AM (green) and PI (red).

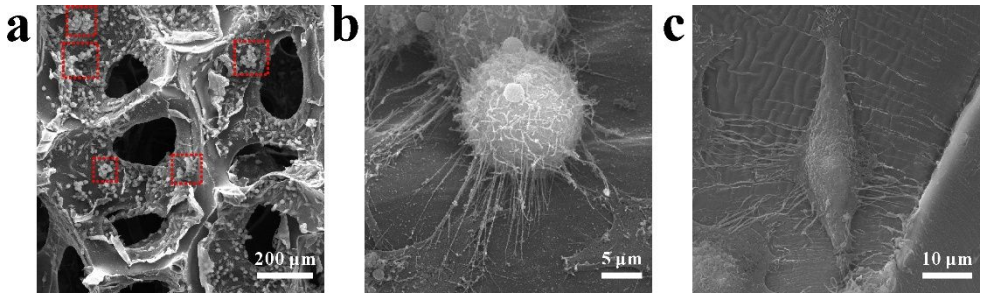

Figure S7. SEM images of cells cultured on PCP/Pt composites for 7 days under different magnification and some of the cell spheroids are marked in the red rectangles.

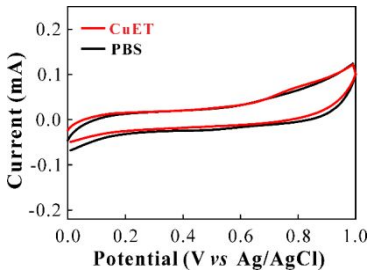

Figure S8. CV of PCP/Pt electrode in PBS with (red) or without 2 μM DSF-$CuCl_2$ (black) at a scan rate of 10 mV/s.

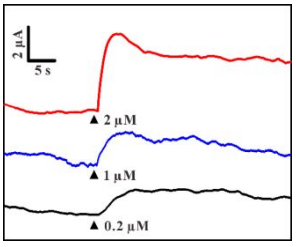

Figure S9. Amperometric response of HeLa cells cultured on PCP/Pt electrode for 5 h in deaerated PBS solution stimulated by different concentrations: 2 μM (red line), 1 μM

(blue line) and 0.2 μM (black line) DSF-$CuCl_2$.

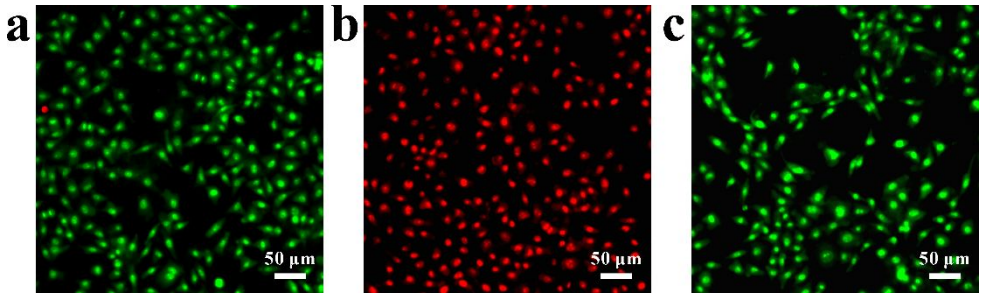

Figure S10. Fluorescent images of HeLa cells incubated with the 2 μM DSF-$CuCl_2$ solution for (a) 20 minutes and (b) two hours and (c) HeLa cells incubated with $CHCl_3$ for 20 minutes, then labeled with Calcein-AM (green) and PI (red).

REFERENCES

(1) Wei, L.; Fan, Y.; Ma, J.; Tao, L.; Wang, R.; Zhong, J.; Wang, H., Highly Dispersed Pt Nanoparticles Supported on Manganese Oxide-Poly(3,4-ethylenedioxythiophene)-Carbon Nanotubes Composite for Enhanced Methanol Electrooxidation. *J. Power Sources* **2013**, *238*, 157-164.

(2) Greczynski, G.; Kugler, T.; Salaneck, W. R., Characterization of the PEDOT-PSS System by Means of X-ray and Ultraviolet Photoelectron Spectroscopy. *Thin Solid Films* **1999**, *354*, 129-135.