Electronic supplementary information

Oxide nanomembrane induced assembly of a functional smart fiber composite with nanoporosity for an ultra-sensitive flexible glucose sensor

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Details of electrochemical measurements.

The electrochemical glucose sensing tests were evaluated on a CHI 660E (Chenhua Instrument, Shanghai, China), and performed in an electrolyte solution of 0.1 M NaOH. Our electrochemical workstation used a three-electrode cell system. An Ag/AgCl (in saturated KCl solution) was used as the reference electrode and a graphite rod was used as the counter electrode. For the preparation of the working electrode, the functional smart textile was tailored into a rectangle with the area of 40 × 30 mm^2, and directly used as the working electrode. The functional smart fiber was pasted onto a glassy carbon electrode with Nafion (5 wt. %).

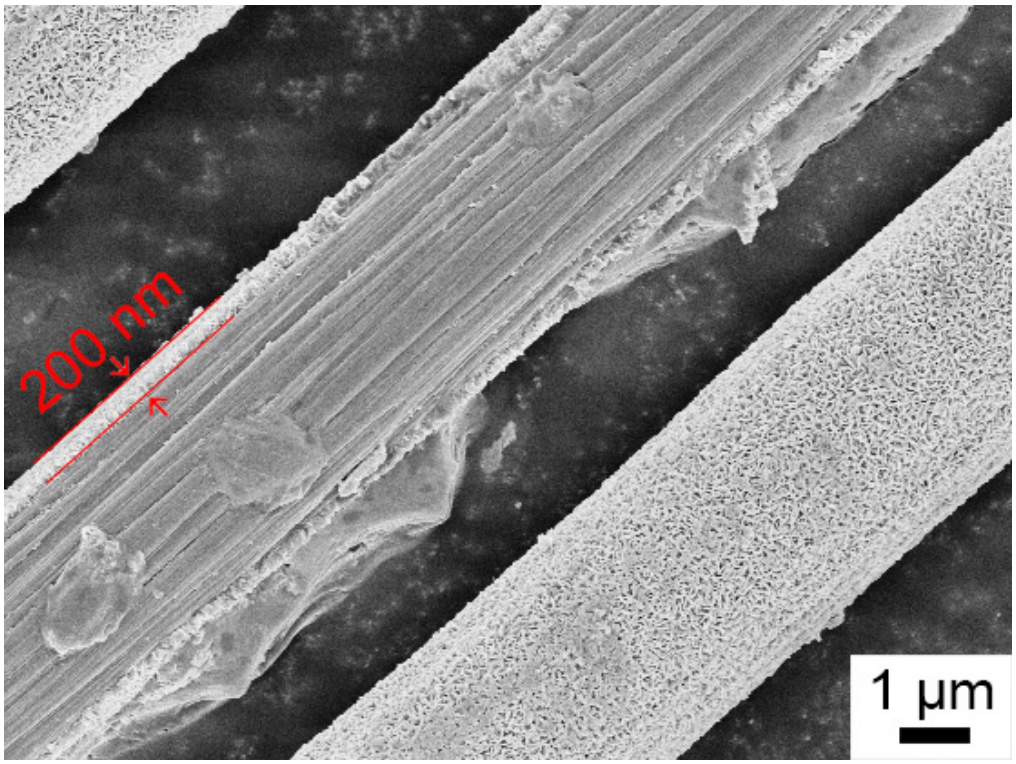

Figure S1. SEM image of Zn, Co-HDS-CF.

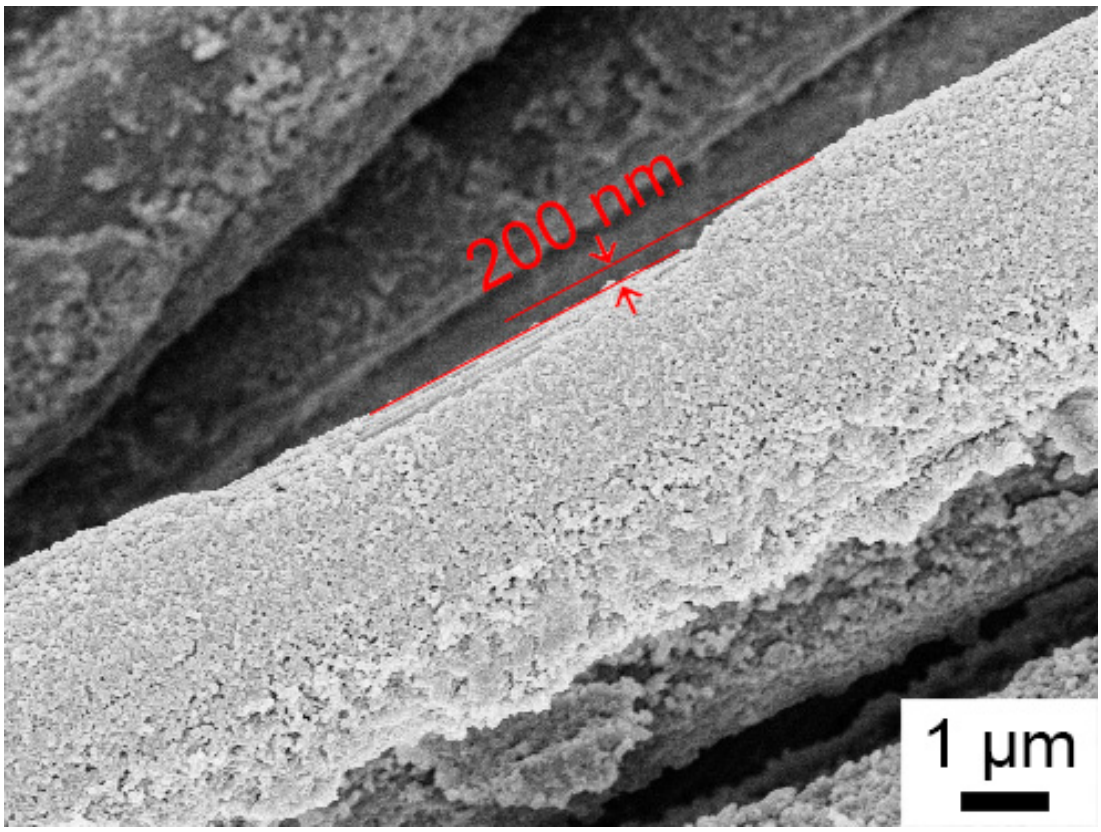

Figure S2. SEM image of Co-PSF.

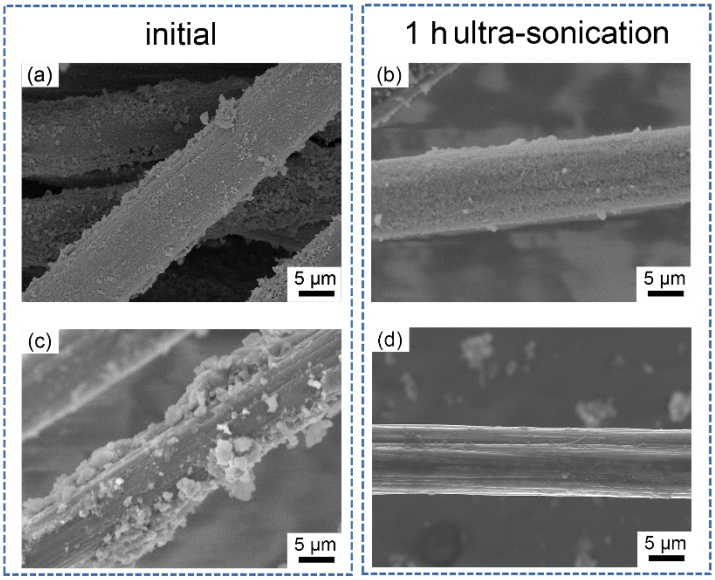

Figure S3. SEM images of ZIF-67 layer grown on ALD pretreated CF (a) before and (b) after ultra-sonication treatment. (c) and (d) are SEM images of corresponding sample without an ALD ZnO layer.

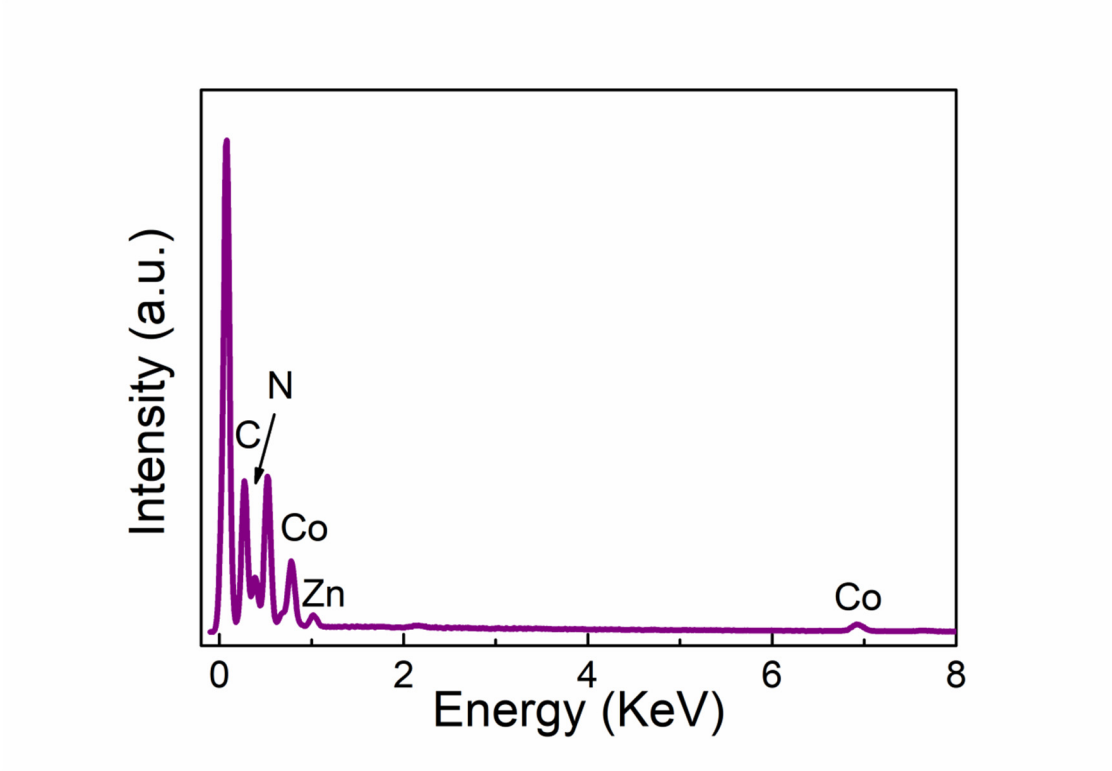

Figure S4. EDS spectrum of Co-PSF.

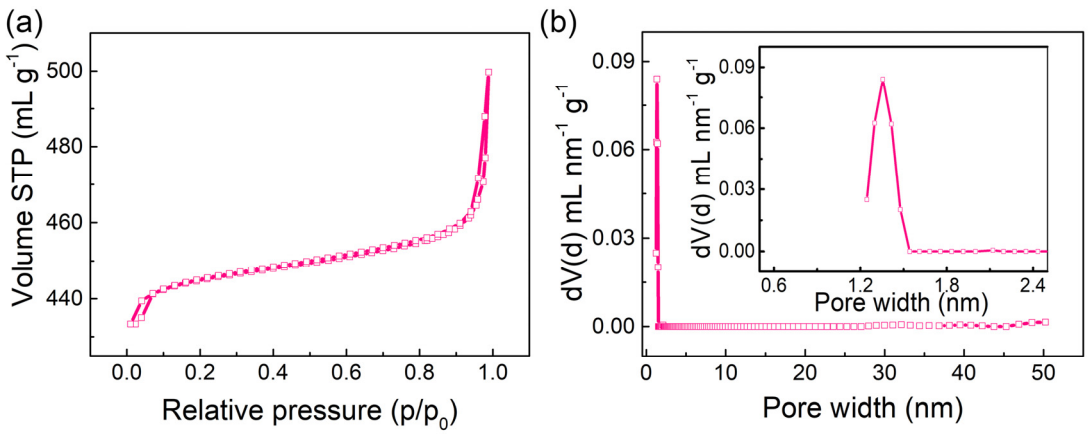

Figure S5. (a) Nitrogen adsorption-desorption isotherms. (b) Pore size distributions of ZIF-67 powder. The inset is the enlarged part of the micropore region.

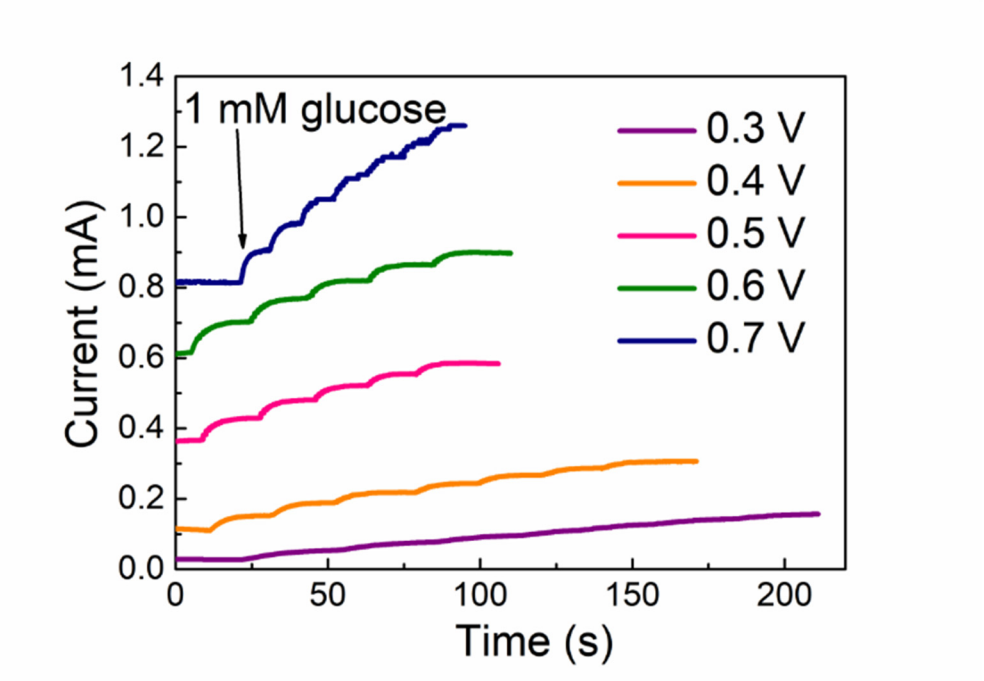

Figure S6. The amperometric response of Co-PSF with successive additions of 1 mM glucose at different potentials.

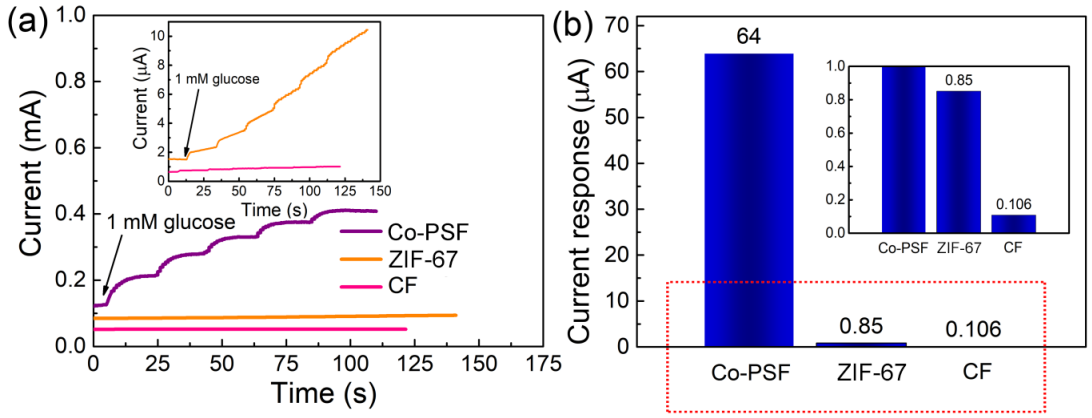

Figure S7. (a) I-t curves of Co-PSF, ZIF-67, and pristine CF in 0.1 M NaOH with successive addition of 1mM glucose. The inset is the enlarged details of I-t curves of ZIF-67 and pristine CF. (b) Current responses of Co-PSF, ZIF-67, and pristine CF towards 1 mM glucose. The inset is the enlarged details.

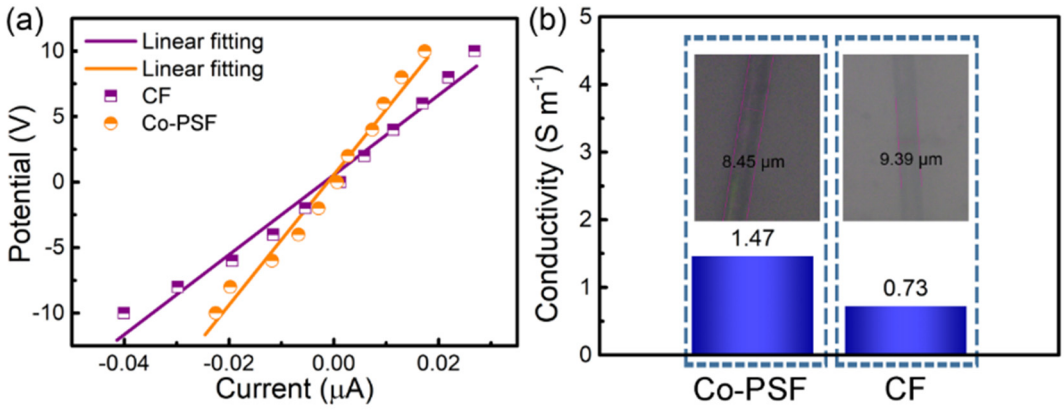

Figure S8. (a) I-V curves and (b) conductivities of Co-PSF and pristine CF. The insets in (b) are photographs of Co-PSF and CF.

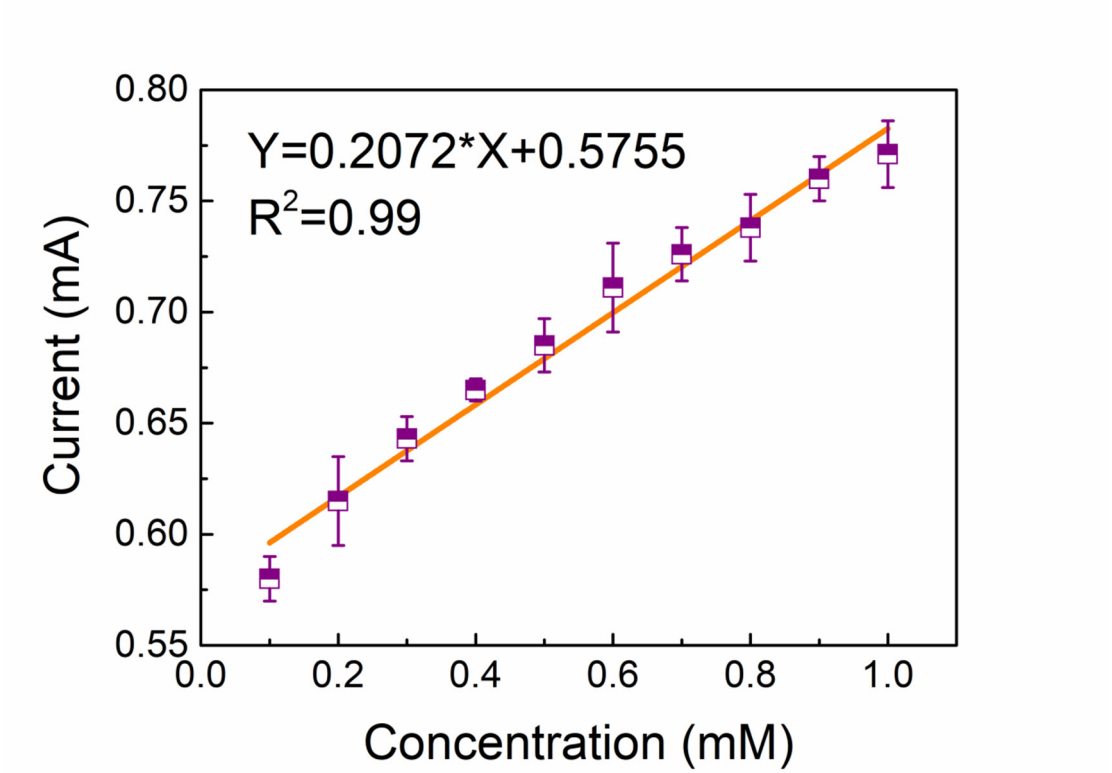

Figure S9. Calibration plot as the function of the glucose concentration, derived from CV results.

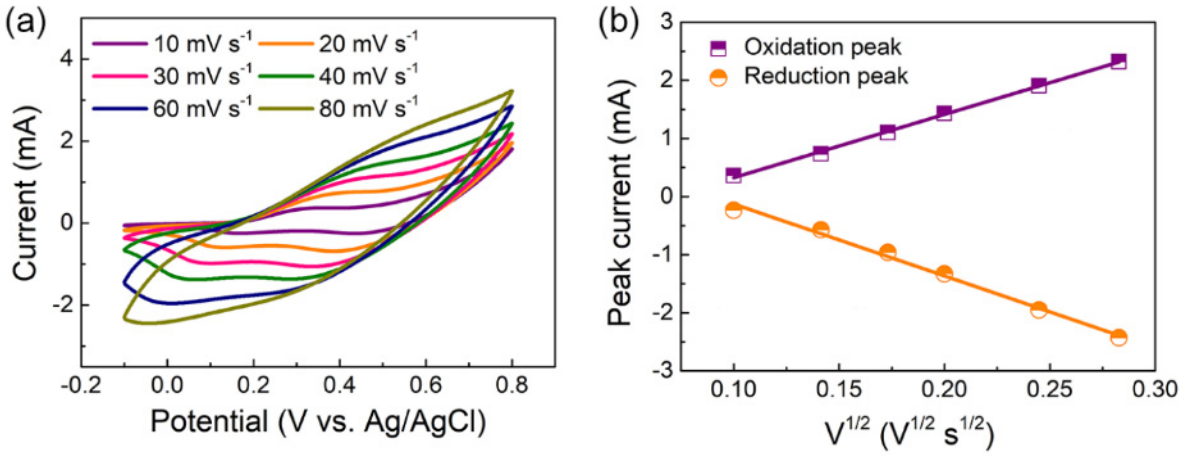

Figure S10. (a) CV curves of Co-PSF at various scan rates in 0.1 M NaOH. (b) Calibration plot as a function of the square root of the scan rate. The reduction peak selected is the peak at ~0.1 V.

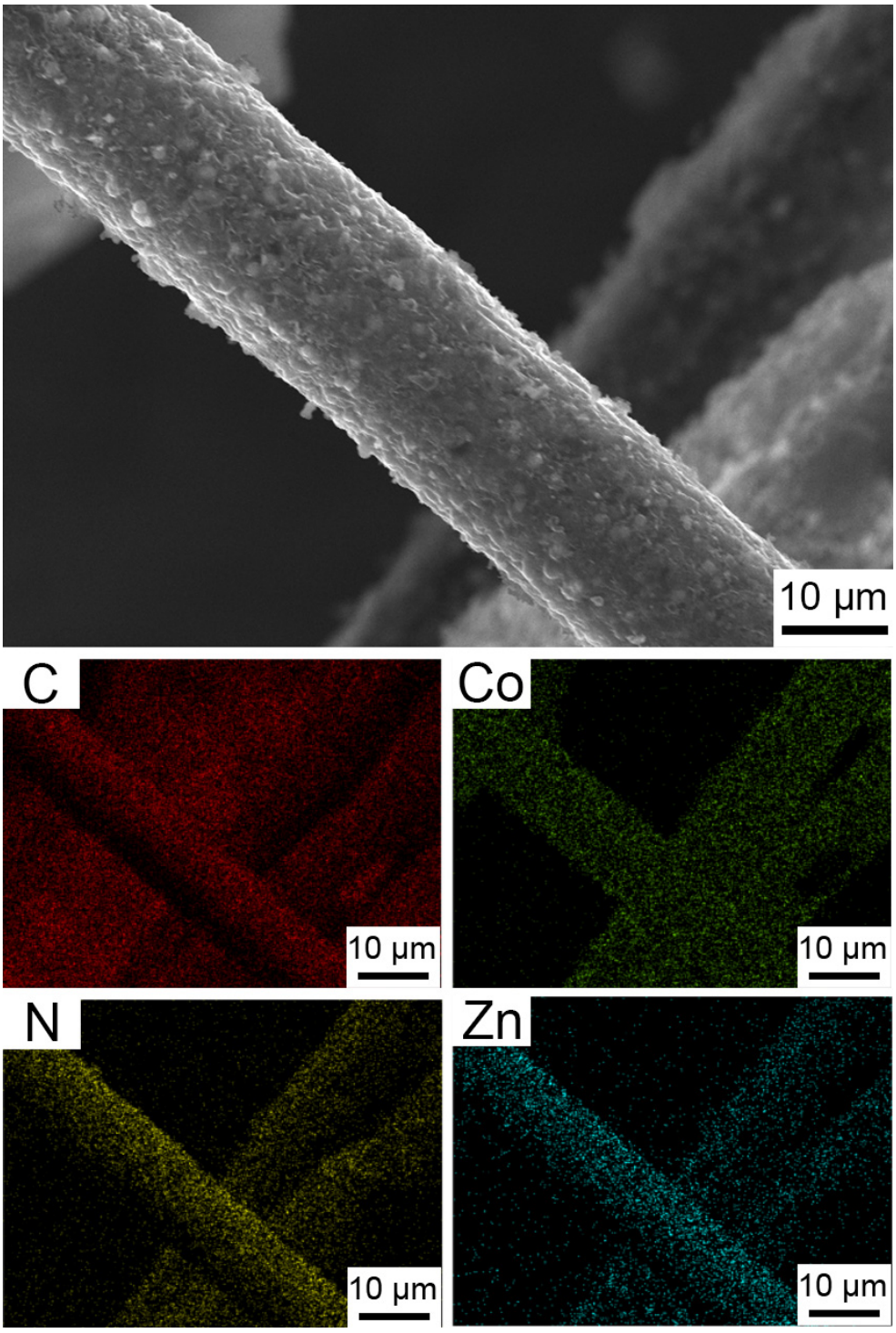

Figure S11. SEM image of Co-PSF after 12 h stability test with EDS mappings, showing the presence of C, Co, N, and very few Zn.

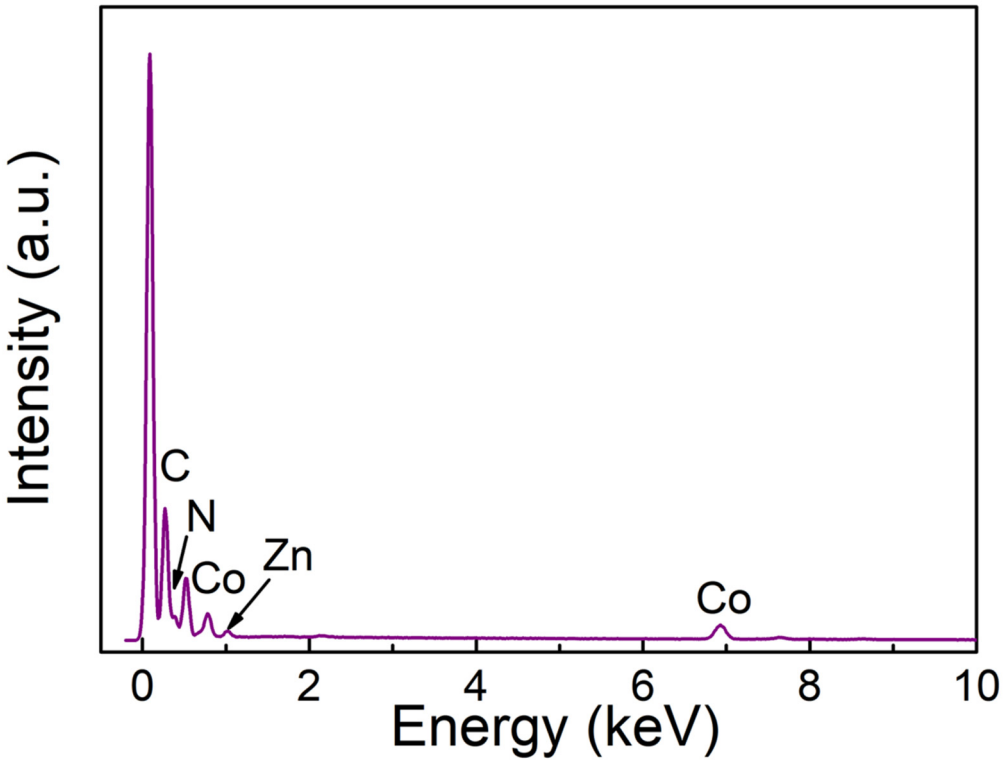

Figure S12. EDS spectrum of Co-PSF after 12 h stability test.

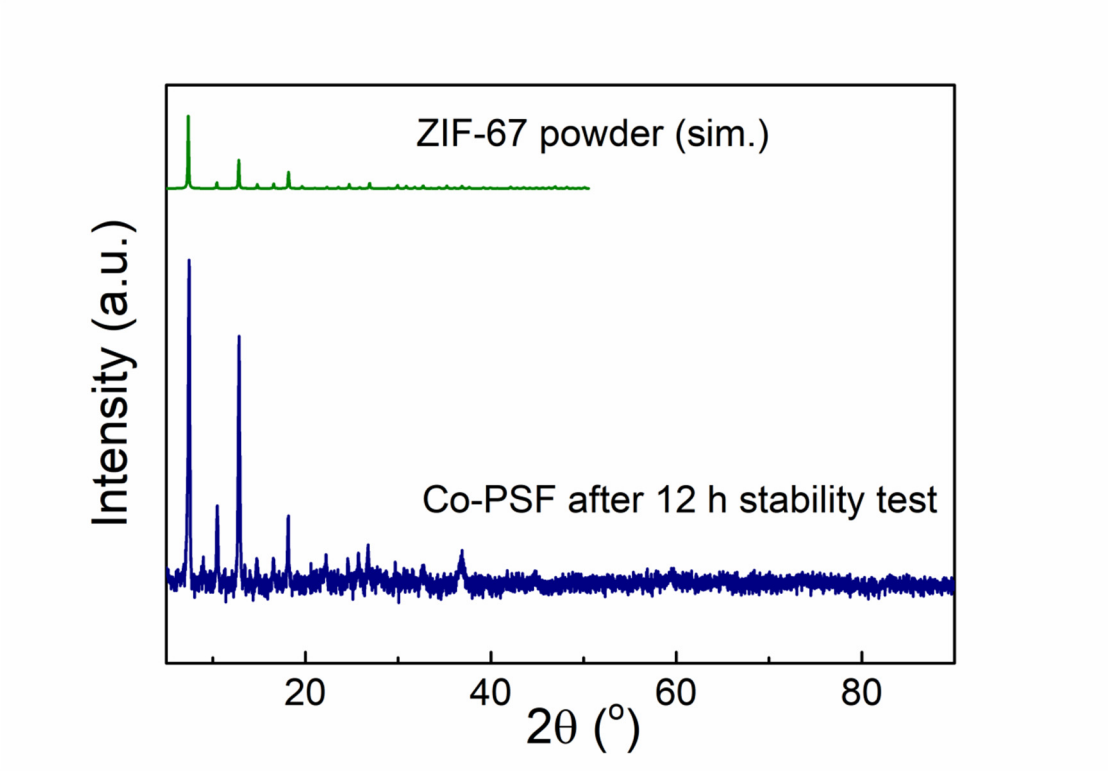

Figure S13. XRD pattern of Co-PSF after 12 h stability test.