Supplementary information for

COF hybrid fibrous nano-network aided Surface-enhanced Raman scattering assay for epinephrine analysis

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1. Supplementary experiment

1.1 Instruments and characterizations

Raman spectra were recorded using a LABRAM HR EVO Raman spectrometer (Horiba, Japan). Powder X-ray diffraction (PXRD) patterns were collected on an APEX-II CCD diffractometer (Bruker, Germany). Fourier transform infrared (FT-IR) spectra were obtained using a Thermo Nicolet 1 spectrometer (Olympus, Japan). The morphology of the samples was examined using a Nova Nano SEM 450 scanning electron microscope (SEM; FEI Company, USA) and a JEM 2100 transmission electron microscope (TEM; JEOL, Japan).

1.2 Synthesis of DMTP (2,5-Dimethoxyterephthalaldehyde)

First, 1,4-Dimethoxybenzene was mixed with 60 mL of 1,4-dioxane, followed by the addition of 10 mL of formaldehyde and 6.0 g of paraformaldehyde. The mixture was heated to 90 °C under reflux in a water bath. Then, 20 mL of hydrochloric acid (ω = 3.6%) was added dropwise over 30 minutes, and heating was maintained at 90 °C for an additional hour. After cooling, the mixture was filtered under suction, washed three times with deionized water, and recrystallized to yield a white powder. Next, 1 g of the obtained white powder was mixed with 1.2 g of hexamethylenetetramine and 10 mL of chloroform, and the mixture was heated in an oil bath at 85 °C for 24 h. The product was then collected by suction filtration, washed three times with chloroform, and dried to yield a yellow product. This yellow product was dissolved in 20 mL of acetic acid and heated in an oil bath at 90 °C for 24 h. After cooling, the mixture was extracted

with dichloromethane. The organic phase was dried over magnesium sulfide, followed by filtration to remove the magnesium sulfide. The solvent was removed by rotary evaporation, and the product was recrystallized from ethanol to obtain a yellow DMTP crystal.

2. Supplementary figures

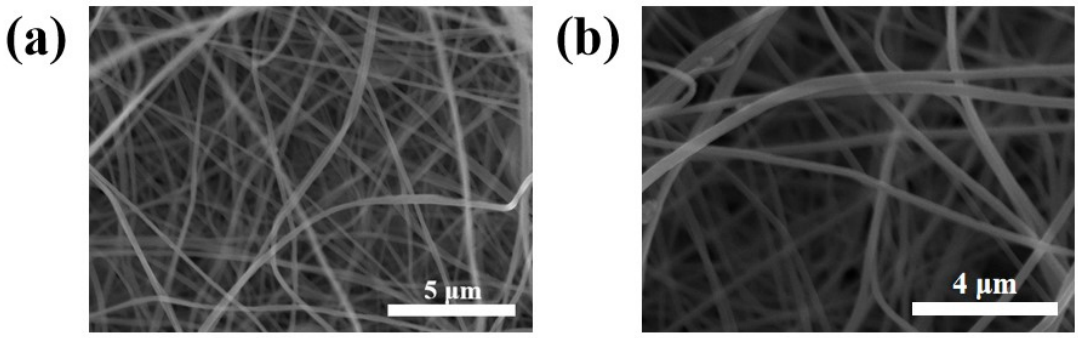

Fig. S1a-b SEM images of PAN nanofibers.

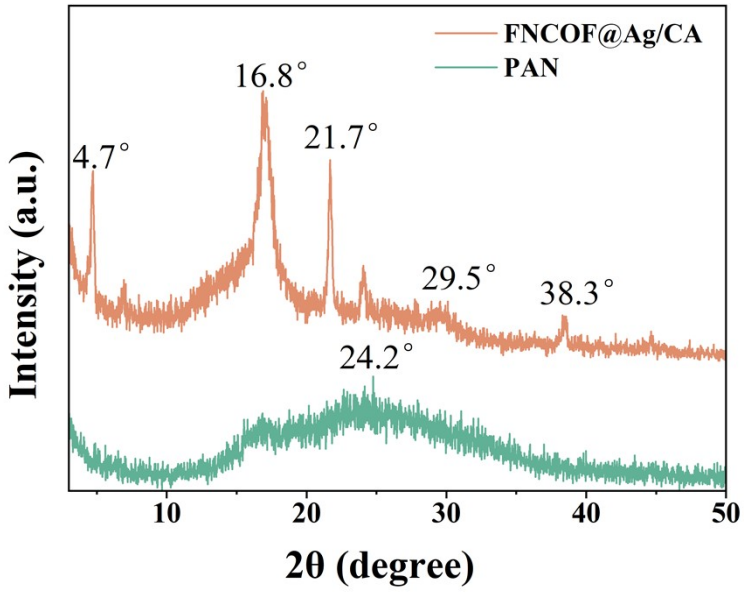

Fig. S2 X-ray diffraction patterns (XRD) of PAN and FNCOF@Ag/CA.

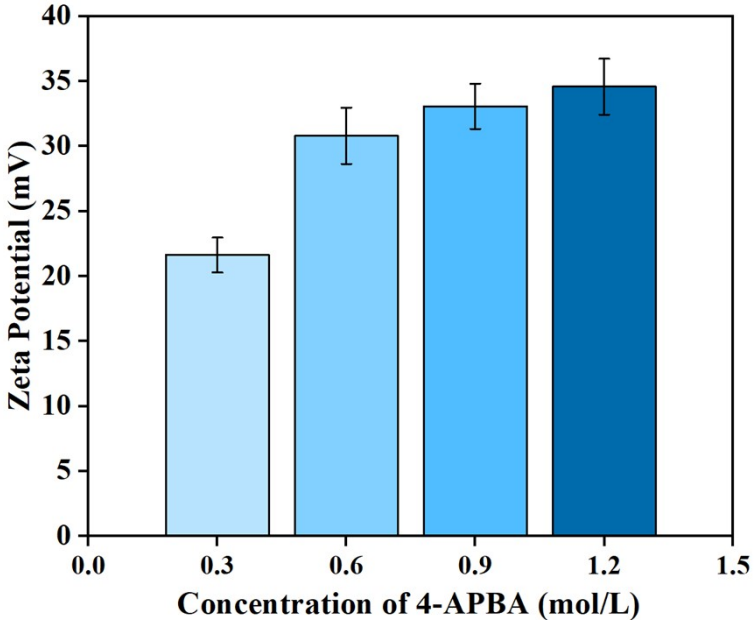

Fig. S3 The surface zeta potentials of FNCOF@Ag-CA/APBA obtained via functionalization in different concentrations of 4-APBA.

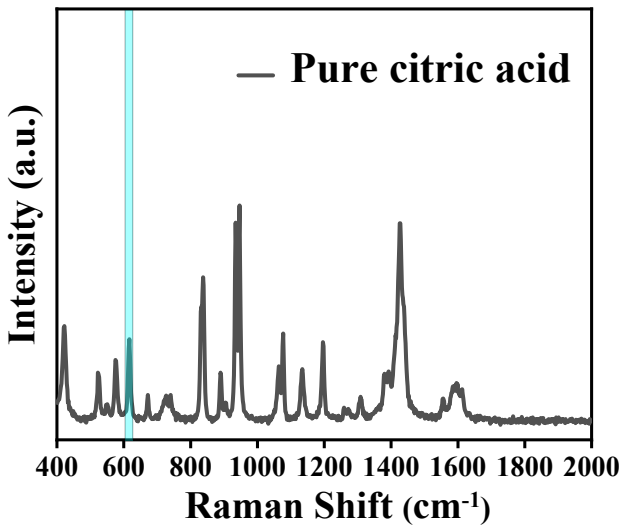

Fig. S4 The Raman spectrum of pure citric acid crystals.

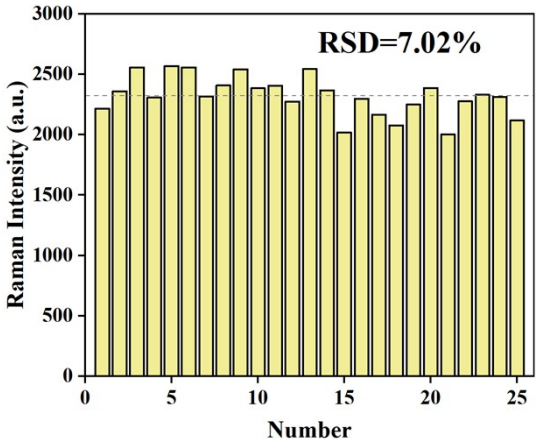

Fig. S5 25 Histograms of signal intensities at the peak at 606 cm^{-1} for FNCOF@Ag-CA/APBA.

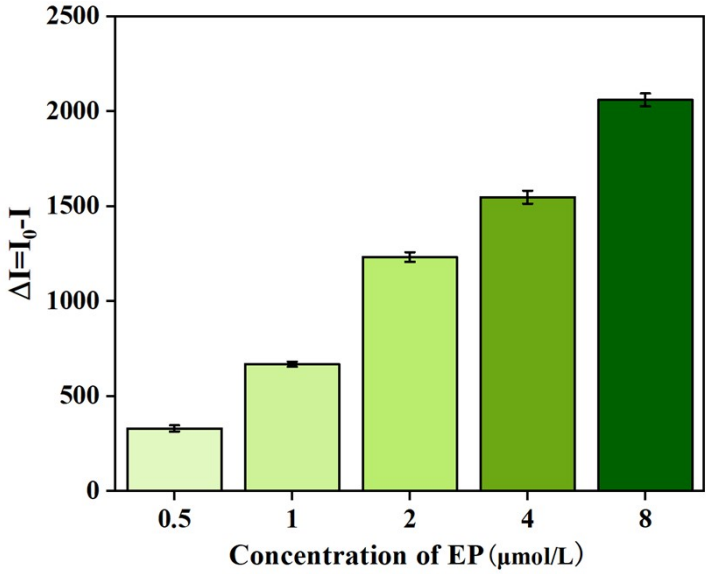

Fig. S6 Changes in SERS signal intensity observed while analyzing different concentrations of epinephrine with FNCOF@Ag-CA/APBA.

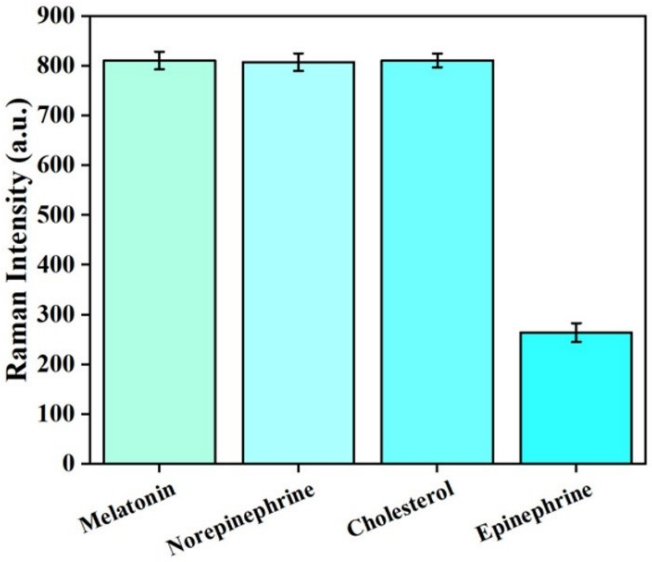

Fig. S7 SERS signal intensity of the reporter molecule sodium citrate obtained from FNCOF@Ag-CA/APBA for the detection of different small molecules at the same concentration (represented by the peak at 606 cm^{-1}, n = 3).

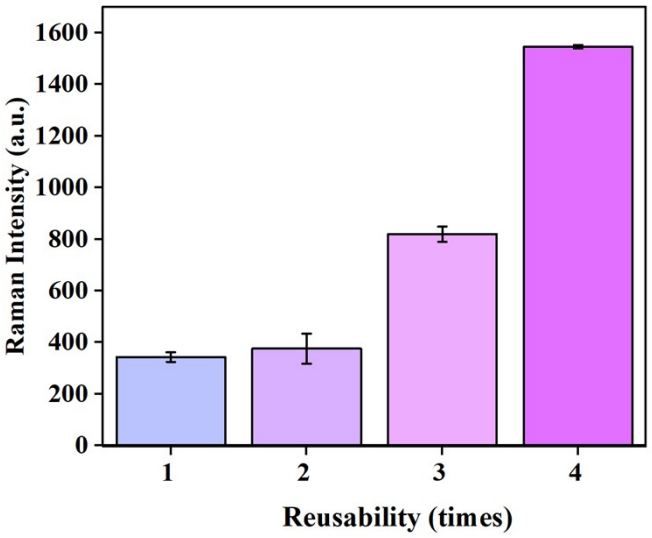

Fig. S8 SERS signal intensity obtained from the analysis of epinephrine using FNCOF@Ag-CA/APBA under different cycles of reuse (represented by the peak at 606 cm^{-1}, n = 3).

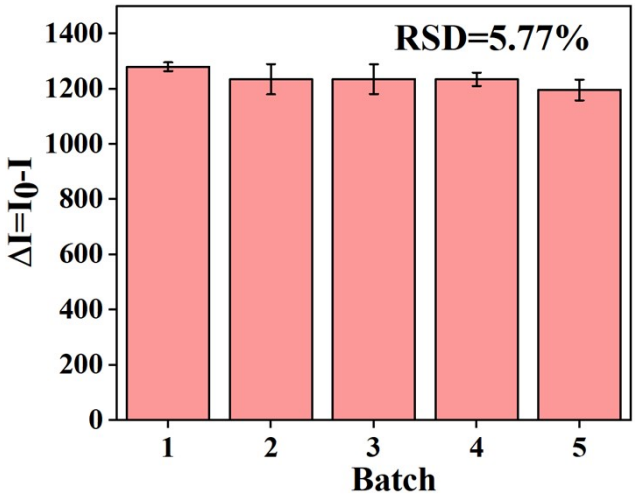

Fig. S9 Signal intensity variations of epinephrine analyzed using different batches of FNCOF@Ag-CA/APBA

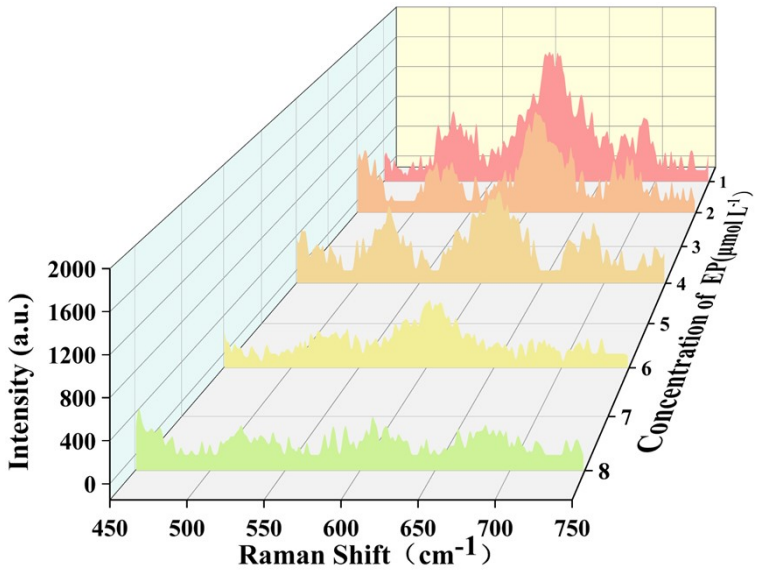

Fig. S10 SERS spectra of the epinephrine capture method based on PAN@COF@Ag-CA/APBA.

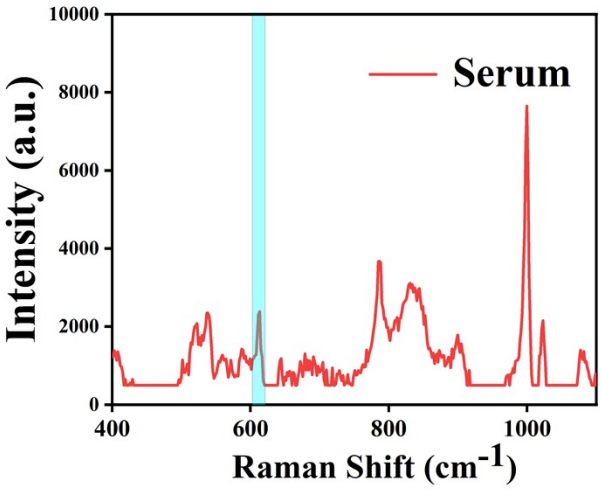

Fig. S11 The SERS spectra of serum analyzed utilizing the FNCOF@Ag-CA/APBA.