

## SUPPORTING INFORMATION

### RESEARCH ON DEVELOPING SERS SUBSTRATES BASED ON ZnO POROUS MEMBRANE DECORATING WITH SILVER NANOPARTICLE AIMED AT DETECTING LOW CONCENTRATIONS OF RHODAMINE B

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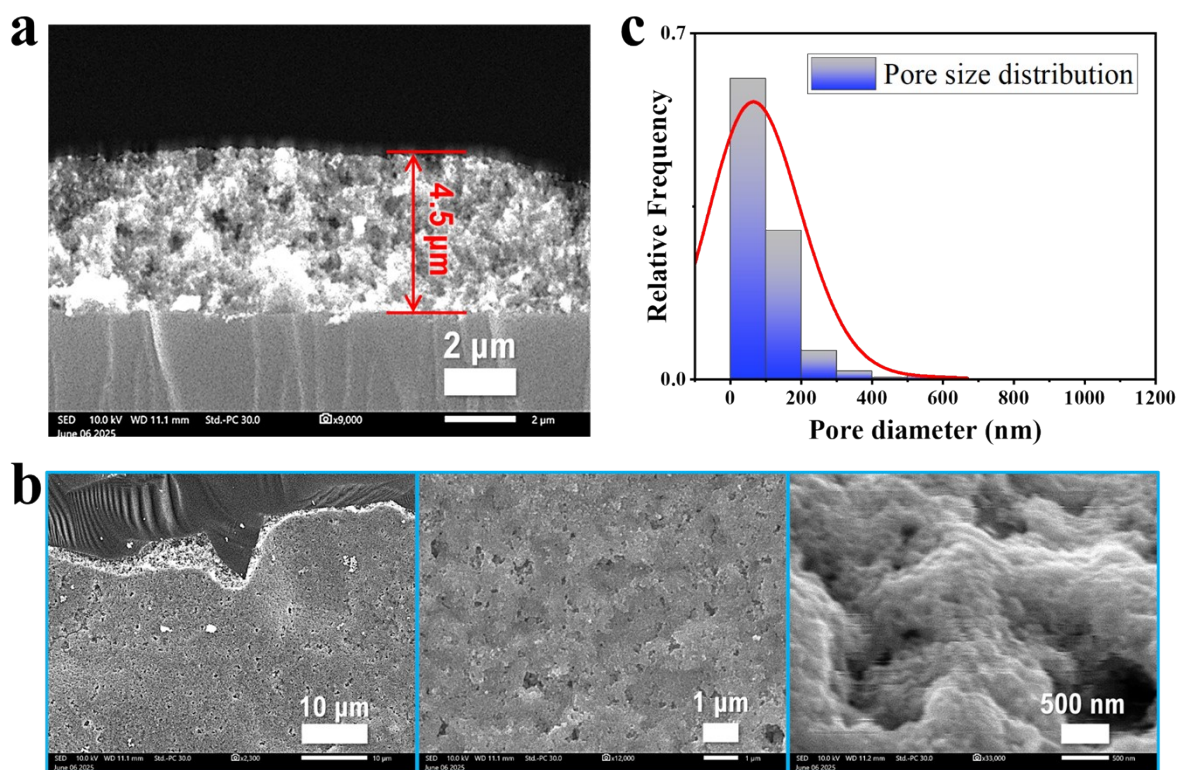
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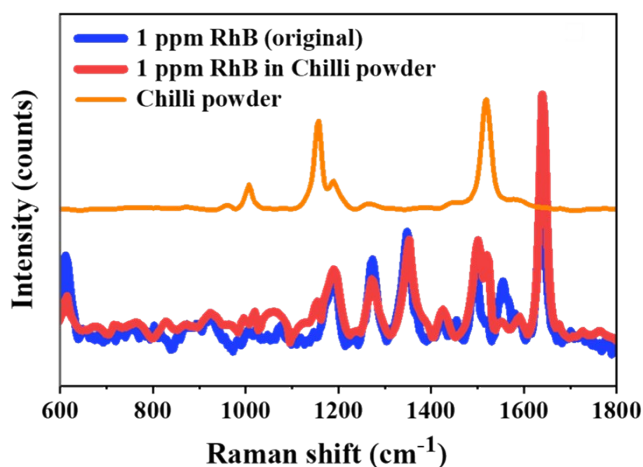
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**Figure S1. Additional SEM data of the Ag/ZnO porous membrane.** (a) Cross-sectional SEM image, showing the thickness of the porous membrane of ca. 4.5  $\mu\text{m}$ . (b) Top-view SEM images at different magnifications, showing the porous surface of the membrane. (c) Surface pore size distribution obtained using ImageJ software to analyze the particle size and distribution on those SEM images; here the result confirms that our membrane mainly contains nanopores (about 60% below 100 nm in diameter, 90% below 200 nm in diameter, and 98% below 300 nm in diameter).



**Figure S2. Practical RhB sensing demonstration.** SERS signals of Ag/ZnO membrane toward 1 ppm of RhB (diluted in water, original) and 1 ppm of RhB (diluted in Chilli powder solution).

The Chilli powder was purchased from a traditional market and mixed with hot water (80 °C) with a concentration of 30 wt%, and followed by centrifugation (2000 rpm, 10 min) to extract the undissolved solids from the supernatant for the Raman tests. As shown in **Fig. S2**, there is no peak of RhB in the Chilli powder solution although Chilli powder has been commonly reported containing RhB (up to 743  $\mu\text{g/kg}$  or 0.75 ppm). For demonstrating the detectability of RhB in the Chilli powder, we mixed RhB with the Chilli powder solution (supernatant); the concentration of RhB in the Chilli powder solution is rounded to 1 ppm for SERS sensing comparison. After Raman measurement, we found that the sensing signals toward 1 ppm RhB (originally diluted in water) and 1 ppm RhB (in Chilli powder solution) are quite similar regarding the position and intensity ratio between the highest and second highest characteristic peaks at 1645  $\text{cm}^{-1}$  and 1360  $\text{cm}^{-1}$ , respectively. This confirms our Ag/ZnO porous membrane can be used for detecting RhB in the Chilli powder.