

Supporting Information

SERS platform based on bimetallic Au-Ag nanowires-decorated filter paper for rapid detection of miR-196a in lung cancer patients serum

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Results and discussion

SERS imaging of AgNW@AuNPs substrate

In order to further compare the uniformity of SERS signal between ordinary filter paper substrate and hydrophobic filter paper substrate, mapping experiments were carried out on the common filter paper substrate and hydrophobic filter paper substrate after adding NBA on the surface. As shown in Figure S1, the scanning range was $20 \times 20 \mu\text{m}^2$, and the intensity of characteristic peak at 592 cm^{-1} was displayed by the color of SERS mapping signal with the color changing from blue (minimum intensity) to red (maximum intensity). It was showed in Figure S1 that the color distribution was very irregular, indicating that the uniformity of the common filter paper substrate was poor. Figure 4B showed that although some polymers could still be found, hydrophobic filter paper substrate had uniform SERS enhancement effect compared with ordinary filter paper substrate. The hydrophobic reagent changed the hydrophilic filter paper from hydrophilic to hydrophobic, which made the sample more evenly distributed on the hydrophobic filter paper matrix and improved the uniformity of the substrate [1].

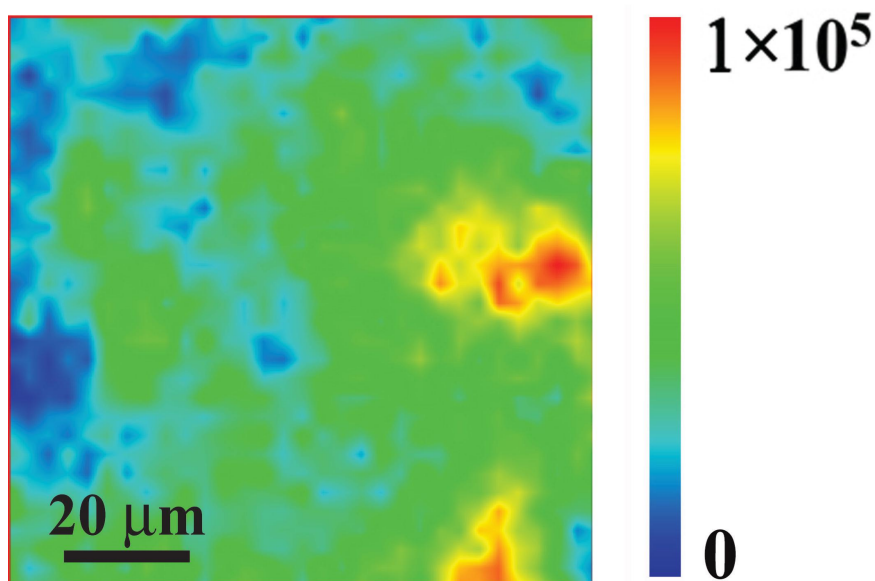


FIGURE S1 SERS mapping for NBA on ordinary filter paper-based AgNW@AuNPs substrate.

Comparison of miR-196a expression in serum of healthy people with different gender by SERS

Eight healthy men and eight healthy women were randomly selected from 30 healthy people and their serums were detected by SERS. The average SERS spectrum was collected by scanning different points 10 times by SERS for each SERS platform and Raman intensities were compared at 1334 cm^{-1} . As shown in Figure S2A, the blue curve represented the average SERS spectra of healthy men and the red curve represented the average SERS spectra of healthy women, these SERS spectra had almost no difference. Figure S2B showed the peak intensity histogram at 1334 cm^{-1} . The deviation of male group (1-8) was 8.76%, that of female group (9-16) was 4.65%, and the average deviation between male and female groups was 1.52%. Therefore, the platform possessed good specificity and sensibility, which demonstrated the high precision in detection for miR-196a in clinical samples.

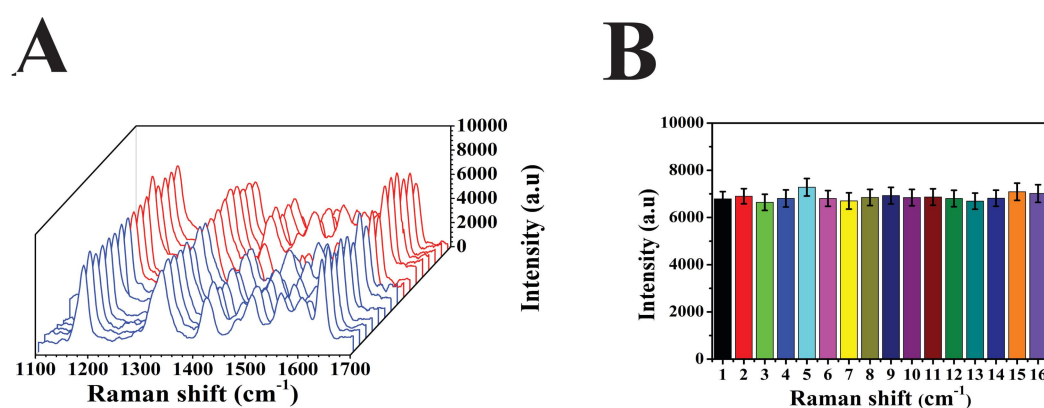


FIGURE S2 (A) SERS spectra of the serum of healthy men and healthy women (1334 cm^{-1}); (B) the peak intensity histogram of the SERS spectra in (A).

References

1. C. M. Zhang, T. T. You, N. Yang, Y. K. Gao, L. Jiang, P. G. Yin, "Hydrophobic paper-based SERS platform for direct-droplet quantitative determination of

melamine,” *Food Chem.*, vol. 287, pp. 363-368, 2019.