High-throughput sensor developed for detecting biochemical molecules with high sensitivity and specificity

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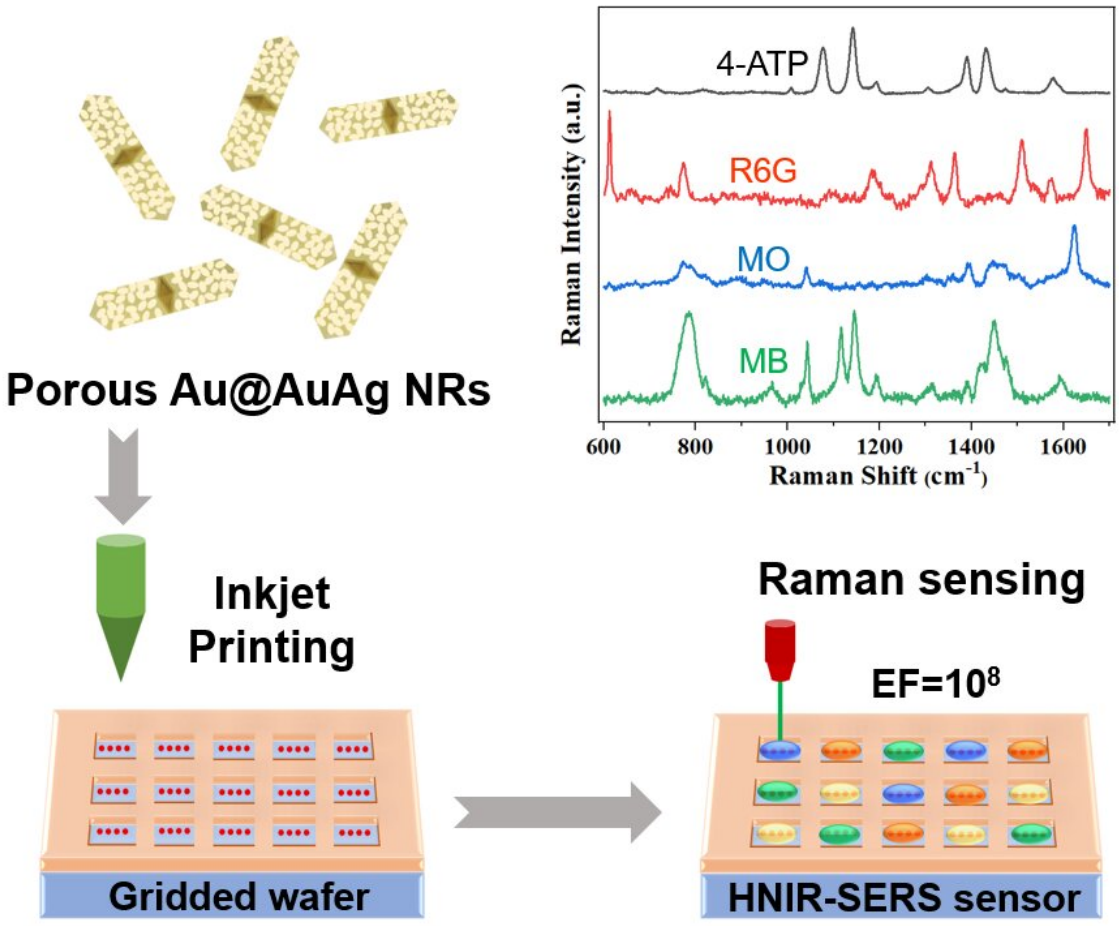

Preparation of the HNIR-SERS sensor and SERS spectra of different molecules with same concentration on the HNIR-SERS sensor. Credit: Wang Yifan

Scientists from Hefei Institute of Physical Science, Chinese Academy of Sciences developed a high-throughput biochemical sensor based on porous Au@AuAg nanorods that can detect biochemical molecules with high specificity and sensitivity.

Their research results were published in *Journal of Materials Chemistry C*.

The misuse of biochemical molecules can cause significant environmental problems, so developing low-cost sensors for detecting these molecules is essential.

The sensor they've developed is called the high-throughput near-infrared surface-enhanced Raman scattering (HNIR-SERS) biochemical sensor. It's a combination of inkjet printing technology and plasma metal nanoparticles that enables high-sensitivity detection of multiple biochemical molecules in one substrate.

To develop this sensor, researchers utilized imprinting technology to fabricate a grid substrate with separated regions arranged in a typical cubic pattern.

They then assembled porous Au@AuAg nanorods on the substrate using inkjet printing, resulting in the formation of the HNIR-SERS sensor. This new type of sensor achieves high sensitivity and specificity in detecting multiple biochemical molecules on one substrate.

The researchers demonstrated the effectiveness of the HNIR-SERS sensor by detecting 4-aminothiophenol (4-ATP), rhodamine 6G (R6G), methyl orange (MO) and methylene blue (MB) with an enhancement factor of 108 for 4-ATP.

This development provides an effective method for realizing high-

throughput and low-cost NIR-SERS sensors and could pave the way for practical applications in Raman detection chips.

More information: Yifan Wang et al, High-throughput surface-enhanced Raman scattering sensors for near-infrared detection of biochemical molecules, *Journal of Materials Chemistry C* (2023). DOI: 10.1039/D2TC05542B

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