NANO HIGHLIGHT
Localized Surface Plasmon Resonance Immunoassay

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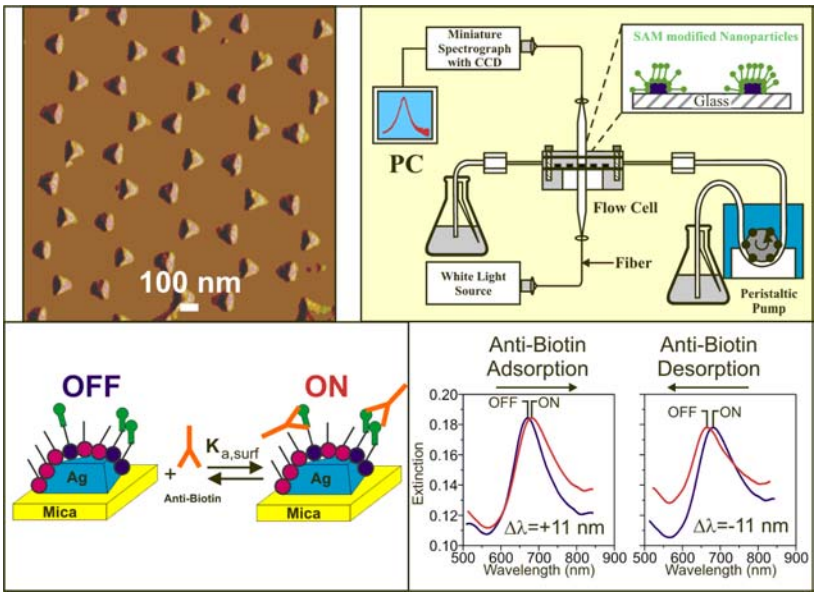
Researchers at the Nanoscale Science & Engineering Center (NSEC) for Integrated Nanopatterning and Detection Technologies at Northwestern University have made advances in the development of a localized surface plasmon resonance immunoassay. The Ag nanoparticle based localized surface plasmon resonance (LSPR) nanosensor yields ultrasensitive biodetection with extremely simple, small, light, robust, and low-cost instrumentation. A commercially viable nanobiosensor should be entirely reusable. In the case of LSPR nanosensors, analyte detection must be entirely reversible rendering the sensor reusable. Reusability has a large impact on both cost effectiveness and ease of use. The reversibility of the binding between anti-biotin and biotin was tested experimentally by exposing an anti-biotin functionalized sample to an excess of concentrated biotin (in buffer). The LSPR spectra depicting the adsorption (~+11 nm shift) and desorption (~-11 nm shift) of this process in buffer is shown in the figure. These data indicate that anti-biotin detection is completely reversible. All measurements were made in 10 mM physiological buffer to ensure the applicability of the results to biological sensing. The instrumental simplicity afforded by LSPR biosensors is expected to greatly facilitate field portable environmental or point-of-service medical diagnostic applications.



Localized Surface Plasmon Resonance Immunoassay: Ag nanoparticle array (upper left), instrumental setup (upper right), schematic representation of the surface chemistry (lower left), reversible LSPR immunoassay (lower right).

References

[1] "A Nanoscale Optical Biosensor: Real Time Immunoassay and Nanoparticle Adhesion", J. C. Riboh, A. J. Haes, A. D. McFarland, C. Ranjit, R. P. Van Duyne, *J. Phys. Chem. B,* 107, 1772-1780 (2003).