



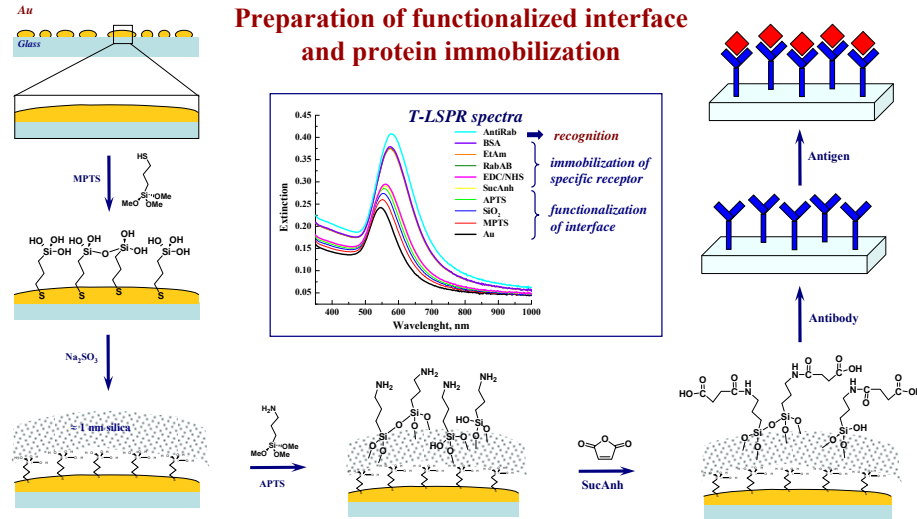
Biological Applications of Transmission Localized Surface Plasmon Resonance (T-LSPR) Spectroscopy

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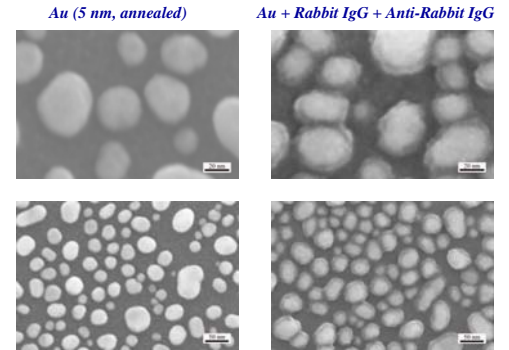
Discontinuous, island-type gold films (typically <10 nm nominal thickness) evaporated on transparent substrates show a localized surface plasmon (SP) extinction in the visible-to-NIR range, conveniently measured by transmission spectroscopy. The SP extinction band is highly sensitive to changes in the dielectric properties of the contacting medium, thus enabling to monitor the binding of molecular layers to the Au island film with submonolayer sensitivity. The method, termed transmission localized surface plasmon resonance (T-LSPR) spectroscopy, provides an effective scheme for label-free biological sensing using basic spectrophotometric equipment.

In the present work the applicability of T-LSPR spectroscopy to monitoring specific antibody-antigen interactions is demonstrated. Protein-derivatized Au island films were used as a biological recognition surface for selective sensing of antigen binding, distinguishing specific and nonspecific interactions. Specific recognition of antigens was demonstrated using an array of four T-LSPR transducers. Further improvement of the system will allow application of the technique to fast, simultaneous determination of a number of proteins using detector arrays.



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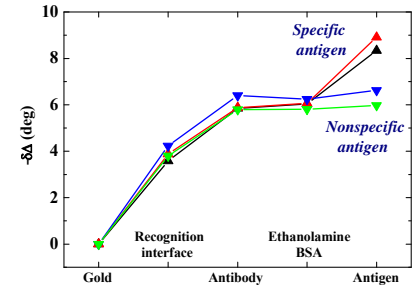
HRSEM



Samples coated with 3 nm Cr.

Ellipsometry Results

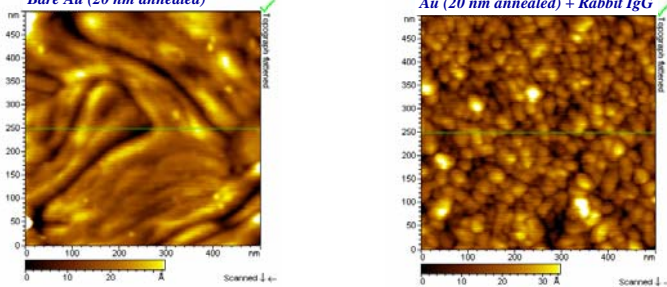
Substrates: 20 nm Au on silanized glass, annealed



Bare Au (20 nm annealed)

AFM

Au (20 nm annealed) + Rabbit IgG



Antibody - Antigen interactions

Antibody: Rabbit Immunoglobulin G (IgG), Mouse Immunoglobulin G (IgG)

Antigen: Anti-Rabbit Immunoglobulin G (IgG), Anti-Mouse Immunoglobulin G (IgG)

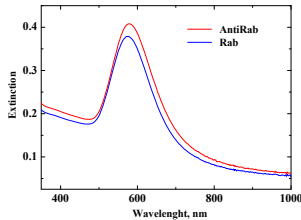
Antibody - Specific antigen



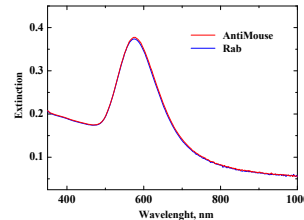
Antibody - Nonspecific antigen



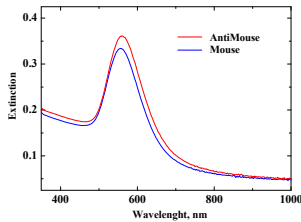
Rabbit - Anti-Rabbit



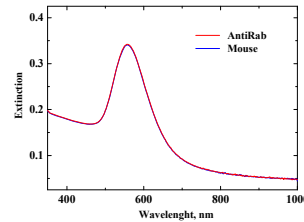
Rabbit - Anti-Mouse



Mouse - Anti-Mouse



Mouse - Anti-Rabbit

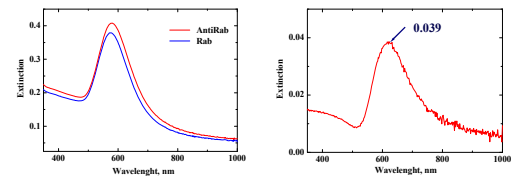


"3S": Simplicity, Sensitivity, Stability

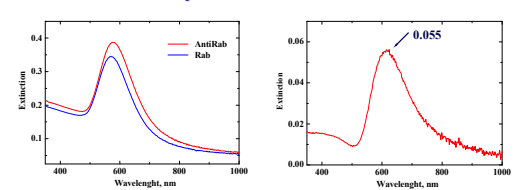
Absolute spectra

Silica-modified Au islands: stable

Difference spectra



Mercaptosilane-modified Au islands



Bare Au islands: simple, sensitive

