

SIMULTANEOUS SURFACE PLASMON RESONANCE AND ELECTROCHEMICAL INVESTIGATIONS OF ALKANE THIOL MONOLAYERS ON A GOLD ELECTRODE

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In this paper we present an integrated optical surface plasmon resonance sensor incorporating a gold electrode, to enable simultaneous electrochemical and optical measurements. The waveguides are fabricated from Pyrex, using photolithographic patterning and K⁺ ion-exchange and have been designed to incorporate a 'Y Junction' which allows simultaneous observation of a sensing and a reference output signal as shown in figure 1. Recent work has demonstrated that such a sensor provides high sensitivity to sub-monolayer changes at the gold electrode surface¹ while allowing electrochemical control of the gold electrode surface.

In this work the gold electrode is coated with self assembled thiol monolayers, and combined electrochemical and optical measurements are used to probe the behaviour of the thiol films at the gold surface. Self assembled thiol layers are commonly used to enable the attachment of lipids to the sensor for investigation of reactions at the lipid surface and these measurements enable us to optimise and control the surface coverage of the thiols. The results are discussed and compared to the results of a numerical simulation.

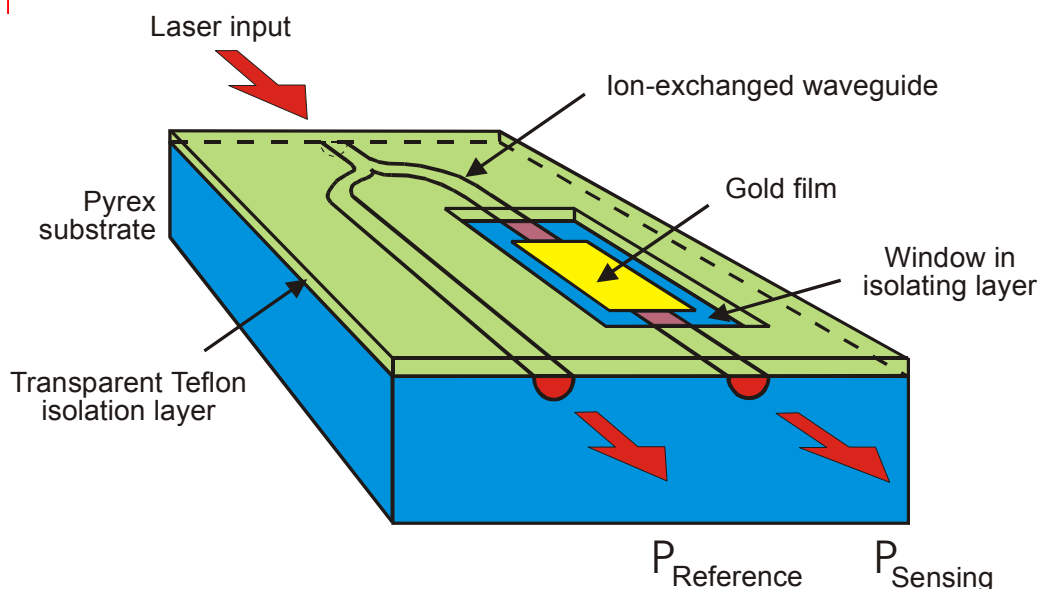


Figure 1. Waveguide SPR Sensor

¹ J.C. Abanulo, R.D. Harris, A.K. Sheridan, J.S. Wilkinson, P.N. Bartlett, Faraday Discussions 2002
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