

An Investigation of Surface Plasmon Resonance

and Its Sensor Applications (2013)

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Surface plasmon resonance is the oscillation of valence electrons excited by p-polarized light at the interface of two media. Surface plasmon resonance is measured by determining the reflectivity of an incident beam of light off of a thin, homogeneous layer of metal with uniform thickness deposited on a glass slide and attached to a prism. At the angle of incidence at which minimum reflectivity occurs a surface plasmon polariton is generated. The angle at which this minimum reflectivity occurs can change when a sensor layer is deposited on top of the gold layer. An experimental setup was designed to detect the minimum reflectivity which indicates surface plasmon resonance. Mathematica was used to generate a theoretical plot of reflectivity vs. angle of incidence. Measurements of the resonance angle have unexpectedly yielded multiple resonance peaks for a thin film of gold. To determine the possible reasons for this phenomenon, the sample was studied via FESEM at Penn State Main Campus. The results of this study were analyzed, and steps were taken to study the new film with the experimental setup.