

Surface Plasmon Photodetectors Based on Noble Metals

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In this work, high sensitivity noble metals used in the Kretschmann configuration based photodetectors applied to detect the presence of biological and chemical species in solutions are investigated. The angle of incidence and film thickness dependencies of the surface plasmon polariton resonance (SPPR) of gold, silver and copper by the attenuated total reflection (ATR) method are studied to monitor and evaluate the SPR reflectance angle and reflectivity change. The analysis of the electric field of the surface plasmon wave which appears at the interface between the metallic layer and the air is carried out by the finite element method (FEM). The simulation is performed using COMSOL Multiphysics software which supports FEM. The aim of the present study is to find the most suitable noble metal and its optimum thickness to improve the performance of the SPR photodetector.

Keywords: Attenuated total reflection method, FEM based COMSOL multiphysics software, Kretschmann configuration, noble metals, reflectivity.

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