INFLUENCE OF DIFFERENT METALS TOWARD SENSITIVITY PERFORMANCE OF FIBER OPTIC SURFACE PLASMON RESONANCE (SPR) BASED SENSOR

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ABSTRACT

The influence of different metals toward the sensitivity performance of fiber optic refractive index sensor based on Surface Plasmon Resonance (SPR) is examined theoretically and numerically being simulated using MATLAB programming software. Four different metals such as gold, silver, aluminium and copper are tested and their sensitivity is evaluated. The simulation is performed by penetrating visible light of wavelength range from 0.3μm to 1.0μm in refractive index media ranging from 1.330 to 1.380 respectively.In this research, the normalised transmitted power is calculated and their resonance wavelength been investigated. The sensitivity performance of the sensor is analysed through the shift in the resonance wavelength produced over certain changes of the index of refraction in sensing media. The metal that capable of producing of a higher shifting in resonance wavelength over a small refractive index changes will be selected as an ideal metal and thus can be utilised in SPR fiber optic system to produce sensor with high sensitivity detection.In this study, it shows that gold produced the highest sensitivity among the other three metals with sensitivity of 4.3724μm/RIU.

Keywords: Surface Plasmon Resonance (SPR), Optical Fiber, Metals, Sensitivity, Resonance Wavelength