



发光学应用及交叉前沿

聚合物波导型表面等离子体共振传感器的特性研究

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摘要： 基于表面等离子体共振理论,将SU-8作为波导芯层材料,以聚甲基丙烯酸甲酯(PMMA)为下包层材料,设计了一款聚合物波导型SPR传感器。理论计算了波导芯层折射率、被测物折射率、不同金属薄膜及其厚度等因素对表面等离子体共振曲线的影响。分析结果表明,在可测试范围内,被测物折射率越大,灵敏度越高;波导芯层折射率减小,共振峰向长波方向移动,被测物检测范围整体向折射率小的方向偏移,波导芯层折射率增大则相反。

关键词： 聚合物波导传感器 表面等离子体共振 折射率

Characteristics of SPR Sensor Based on Polymer Waveguide

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Abstract: A polymer waveguide sensor was designed based on the theory of surface plasmon resonance (SPR). The sensor with SU-8 polymer as the waveguide core material is fabricated on a silicon substrate with a under cladding layer of PMMA. Effect of refractive index of polymer, refractive index of analyte, the different metal, and the thickness of metal on SPR curve is analyzed. Theoretical analysis results show that the sensor sensitivity is improved with the refractive index of analyte increase. The resonance wavelengths of SPR sensor move to longwave direction when the refractive index of polymer is low, and its detection range trend to move to long refractive index. Otherwise the results are contrary.

Keywords: polymer waveguide sensor surface plasmon resonance index of refraction

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