SPECTRAL ANALYSIS OF POLARIZATION CHARACTERISTICS OF SURFACE PLASMON RESONANCE IN NANOSIZED GOLD FILM

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S u m m a r y

Polarization properties of the surface plasmon resonance (SPR) in a nanosized gold film fabricated by the thermal evaporation are studied with the use of the internal reflection method and the modulation polarimetry technique. The spectral and angular characteristics of the reflection coefficients for linearly polarized radiation at fixed azimuths of the electromagnetic wave field directed in parallel, R_p^2, and perpendicularly, R_s^2, to the incidence plane are measured, as well as those of the polarization difference $\rho = R_s^2 - R_p^2$, which is a product of the modulation technique. A well-pronounced asymmetry of the $\rho(\lambda)$ spectra is revealed. A method of determination of the non-resonant component in the $\rho(\lambda)$ spectra is developed, and the approximation of spectra by Gaussian functions with regard for this asymmetry is done. Three resonant components are resolved in the resulting characteristics $\rho_{\mathrm{SPR}}(\lambda)$, and their interpretation based on the previously developed theoretical model of waveguide modes at both film surfaces is proposed. The parameters of resonances are determined, and the corresponding dispersion relations are plotted.