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Optical properties of Au- and Cu- based layered structures

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The significant potentialcattributed to multilayer films consisting of alternating layers of ferromagnetic 3d-transition metal and a noble metal exists because of, such used as sensitive sensors. Besides the sarouses interest in elucidating the nature of changes in optical properties of such systems during their transformations from some island structure to a continuous one while their thickness increase is still actual attractive.
A Semilab SE-2000 spectroscopic ellipsometer, was used to find the optical settings in the $Au-$ and $Cu-$samples. As a result, we obtained, the phase shift Δ(λ) between the p-and s-components of the polarization vector and the azimuth ψ(λ) of the restored linear polarization for these samples at constant value of the light incidence angle of 70°.
The refractive index (n),absorption index (k),optical conductivity(σ), real ($_1$), and imaginary ($_2$) parts of the dielectric function, and reflection coefficient (R) were determined due to spectroellipsometric data and solution of principal ellipsometrиuc equation.
It was found theat the interband absorption in photon energy range from 2.5 to 4.5 eV decreases by at least 40% in the $Cr_{1.5nm}Au_{45nm}Glass$ layer system relative to one for the bulk gold sample.
For $Cr_{1.5nm}Cu_{43nm}Glass$ heterostructure appropriate of such value due to optical conductivity of a bulk copper sample isequel to 15% These differences between the values of the optical characteristics of layer structures investigated and bulk samples may be explained by the disordering of the crystal structure inherent for bulk samples of gold and copper.

Topics

Session A. Physics of condensed matter and spectroscopy

Primary author: Mrs ROSHCHANSKAYA, Alexandra (Taras Shevchenko National University of Kyiv, Faculty of Physics, Chair of Optics)

Co-authors: Mr KOVANZHI, Petro (Taras Shevchenko National University of Kyiv, Faculty of Physics, Chair of Optics); Prof. POPERENKO, Leonid (Taras Shevchenko National University of Kyiv, Faculty of Physics, Chair of Optics); Mr KRAVETS, Vasyl (Taras Shevchenko National University of Kyiv); Ms KONDRATENKO, Olga (V.E. Lashkaryov Institute of Semiconductor Physics,)

Presenter: Mrs ROSHCHANSKAYA, Alexandra (Taras Shevchenko National University of Kyiv, Faculty of Physics, Chair of Optics)

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