Supplementary Material to the article

"Local surface plasmon resonances in Cu/As_2Se_3 film structures"

I. DETAILS OF THE USE OF ELLIPSOMETRY

In our experiments, the ellipsometric parameters Ψ and Δ characterizing the amplitude and phase changes of the light beam reflected from the film were measured at two angles of incidence α = 51 and 53°, close to the Brewster angle of the glass substrate. After that, the measured dependences $\Psi(\lambda)$ and $\Delta(\lambda)$ were approximated with the corresponding target functions $\Psi^t(\lambda)$ and $\Delta^t(\lambda)$. In particular, the target functions were created as a result of modeling the investigated film in the form of several layers, each of which was described by the most appropriate dispersion formula using the database available in the software package of the spectroscopic ellipsometer. In creating the model of the sample, air was the uppermost layer used, followed by the roughness layer, the chalcogenide (As_2Se_3) layer, the copper layer, the glass substrate, and finally the second air layer. The chalcogenide layer was mathematically modeled using the Tauc-Lorentz dispersion formula and the copper layer was modeled using the Drude-Lorentz formula. In the process of approximation, the refractive index *n*, extinction coefficient *k*, film thickness *d*, and fitting parameters included in the mathematical expressions describing the physical models were chosen in such a way as to ensure maximum approximation of $\Psi^t(\lambda)$ and $\Delta^t(\lambda)$ to the experimental dependencies $\Psi(\lambda)$ and $\Delta(\lambda)$. This was achieved using the software package of the ellipsometer, which automatically calculates the relative fitting error. A very good fit of the approximating functions to the experimental data with a root mean square deviation error of less than 0.2 was obtained (see Fig. S1).

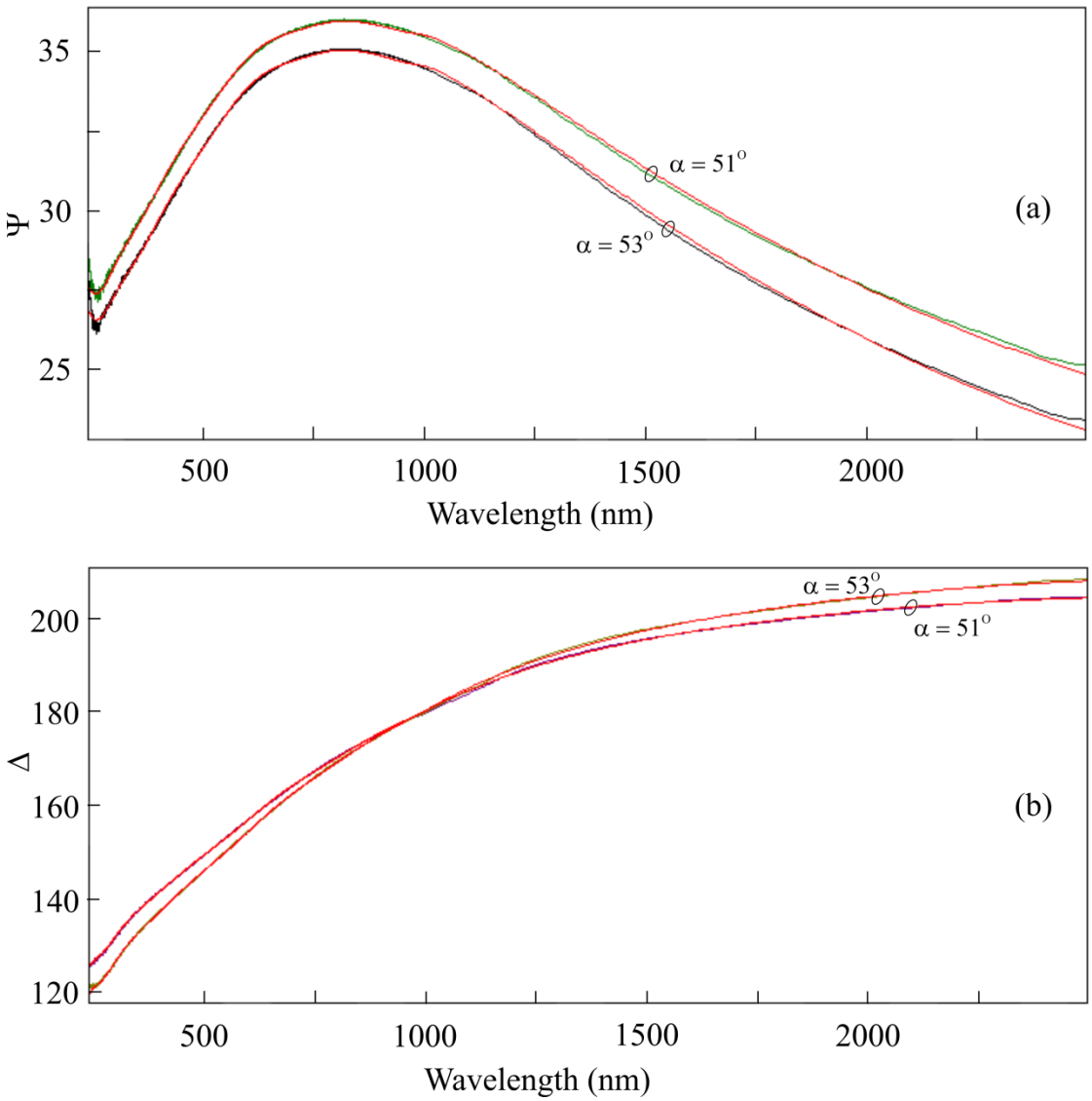

FIG. S1. Experimental measurements (green) and their approximations (red) for ψ (a) and Δ (b) as functions of the wavelength at incident angles α = 51 and 53 ° for the film structure Cu(35 nm)/As_2Se_3(50 nm).