Contribution ID: **120** Type: **Poster**

Optical anisotropy of surface layers of ribbons of the iron-based amorphous alloys

Saturday, 26 November 2022 11:34 (4 minutes)

Optical properties of the rapidly quenched ribbons of the Fe-based amorphous alloys in the infrared λ = 2–25 μm were studied by spectral ellipsometry. The ellipsometric parameters Δ and Ψ were measured for several azimuthal directions α in own plane of the samples to detect of its optical anisotropy. The frequency dependencies of the real ϵ_1 and imaginary ϵ_2 parts of the dielectric function were then calculated.
It was found that dependencies of ϵ_1 for iron-based amorphous alloys are Drude-like ones in the infrared. Also the $\epsilon_1(h/nu)$ curves for different azimuthal angles α differ significantly. Such behavior of the $\epsilon_1(h/nu)$ de-pendencies is evidence of the optical anisotropy in these ribbons. It was also investigated how optical anisotropy manifests itself in the change of parameters of the electronic subsystem of amorphous films. The plasma ⊠p and relaxation ⊠ frequencies were calculated from azimuthal ellipso-metric measurements by applying the functions F1–F3 that are based on the Drude ratio. It was found that the plasma and relaxation frequencies of the Fe-based amorphous alloys are change significantly with the gradual azimuthal rotations of the ribbons in their own plane. Such be-havior of optical and electronic properties is a consequence of the pres-ence of the deformation and elastic stresses formed on the surface layer of ribbons.

Topics

Contact Email address

Primary author: Mr KOVANZHI, Petro (Taras Shevchenko National University of Kyiv, Ukraine)

Co-authors: Dr YURGELEVYCH, Iryna (Taras Shevchenko University of Kyiv, Ukraine); Prof. POPERENKO, Leonid (Taras Shevchenko National University of Kyiv, Faculty of Physics, Chair of Optics)

Presenter: Mr KOVANZHI, Petro (Taras Shevchenko National University of Kyiv, Ukraine)

Session Classification: Poster session