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XVI МІЖНАРОДНА КОНФЕРЕНЦІЯ З ФІЗИКИ І ТЕХНОЛОГІЇ ТОНКИХ ПЛІВОК ТА НАНОСИСТЕМ
(присвячена пам'яті професора Дмитра Фреїка)
Матеріали

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Materials
XVI INTERNATIONAL CONFERENCE ON PHYSICS AND TECHNOLOGY OF THIN FILMS AND NANOSYSTEMS
(dedicated to memory Professor Dmytro Freik)

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Optical Absorption and Compositional Disorder in Thin Films of As-Sb-S (Se)

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Found that when introduced into arsenic sulfide selenium (up to 15 at.%) and antimony (up to 12at.%) Absorption edge shifted to the long-wavelength region of the spectrum. The refractive indices n amorphous films $As_{40}S_{60-x}Se_x$ and $As_{40-y}Sb_yS_{60}$ determined at a wavelength of 710 nm with increasing concentration of Se and Sb increases, while dispersion curves $n(\lambda)$ shifted to lower energies.

Reducing optical pseudogap *Eg* with a slight change of inclination of the absorption edge in thin layers of the systems caused by restructuring in the transition from As_2S_3 to As_2Se_3 and Sb_2S_3. This means that the type of structural variation in the composition of the matrix of amorphous films $As_{40}S_{60-x}Se_x$ and $As_{40-y}Sb_yS_{60}$ remains virtually unchanged. The main structural units forming the structure of the film is trigonal pyramid $AsS(Se)_{3/2}$, $SbS_{3/2}$ and $As(Sb)S_{3/2}$ in the presence of a significant number of molecular fragments homopolar bonds.

When irradiated with a laser (λ = 530 nm, E = 95 mW/cm^2) thin layers set to shift to long-wavelength spectra of spectrum (is fotopotemninnya films), pointing to a decrease in the optical pseudogap. For all investigated films levels photoinduced changes of optical parameters decreases with increasing time of exposure. Changing the position and shape of the absorption edge, and n values *Eg* amorphous films caused by structural changes that occur in them under the influence of laser irradiation.

Amorphous films of As-S-Se and As-Sb-S characterized microheterogeneous structure, ie their structural matrix mainly based groups with ties heteropolyarnymy ($AsS(Se)_{3/2}$, $SbS_{3/2}$) in the presence of structural fragments called homopolar bonds. Irradiation of films leads to rupture and switchties arsenic and arsenic chalcogen-chalcogen in structural fragments As_4S_4 and chalcogen chains to form structural units of bonds heteropolyarnymy As-S, As-Se and Sb-S. This, in turn, leads to the polymerization of molecular groups located most optimal space in the grid trigonal pyramids with little change bond angles relations S (Se)-As-S(Se)-, S-As(Sb)-S . Higher, compared with $As_{40}S_{60}$, photosensitivity film $As_{40}S_{60-x}Se_x$ and $As_{40-y}Sb_yS_{60}$ with x=12 at.% and y=4.6 at.% Is explained by their greater of disordering matrix due to high content of structural fragments homopolar bonds.