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To the memory of Prof. Valery Kharkyanen

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BOOK OF ABSTRACTS

Energy dependent luminescence of realgar, auripigment and As_2S_3 glass with anticancer nanophase realgar inclusion

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In PL spectra of long term aged on air $\text{g-As}_2\text{S}_3$ with realgar nanophase inclusions at $W_{\text{ex},4}=3.1$ eV dominate the band near 2.8 eV, typical for PL band of $\text{As}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ solution (Fig.1). In such case in Raman spectra appeared the band at 680 cm^{-1} [1], known for $\text{As}(\text{OH})_3$. In PL spectrum excited by $W_{\text{ex},2}=2.48$ eV ($\lambda_{\text{ex},2}=500$ nm) there are picking distinct PL bands at $E_1^*=2.04$ and $E_2^*=2.26$ eV (Fig.1). Last PL maxima are known for oxides phases As_2O_3 and As_2O_5 . Formation oxide phases in $\text{g-As}_2\text{S}_3$ may be connected with photo-aging. Rally, at $W_{\text{ex},1}=1.77$ eV in PL spectra we observed the PL band at $E_1=1.72$ eV, typical for realgar ($\text{r-As}_4\text{S}_4$). At $W_{\text{ex},2}=2.25$ eV (Fig. 2), at which intensively occur polymorphic transformation realgar to pararealhar [1], the PL maximum with E_1 shifted to $E_2=1.86$ eV (we assigned to $\text{p-As}_4\text{S}_4$) and at $E_1^*=2.04$ (As_2O_3) is seen shoulder. Photo-degradation of surface with increasing energy of excitation to $W_{\text{ex},4}=3.1$ eV accompany with formation the band near 2.8 eV (Fig.2), less intense than in case long term aged on air surface (Fig.1). Similar, as above mentioned PL bands, where found in PL spectra crystalline auripigment As_2S_3 and $\text{r-As}_4\text{S}_4$. Processes natural and photo-aging should be take into account during medical treatment by realgar.

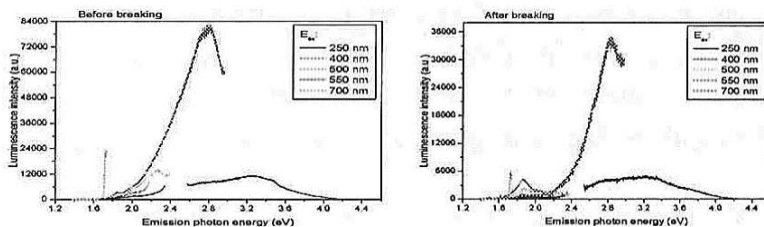


Fig.1. PL spectra aged on air $\text{g-As}_2\text{S}_3$ Fig.2. PL spectra freshly fractured $\text{g-As}_2\text{S}_3$

3. Holomb R., Mateleshko N., Mitsa V., Johansson P., Matic A., Veres M. New evidence of light-induced structural changes detected in As-S glasses by photon energy dependent Raman spectroscopy Journal of Non-Crystalline Solids.- 2006.- 352. -Pp. 1607–1611.