THE INVESTIGATION OF POLYTHERMIC SECTION Ga_2S_3-$(Y_2O_2S)_{0.50}(Tb_2O_2S)_{0.50}$ OF QUASI-TERNARY SYSTEM «Y_2O_2S – Ga_2S_3 – Tb_2O_2S»

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At present time oxisulfides of lanthanoids and solid solutions on their basis are used as the initial substances for obtaining optic materials transparent in the wide field of spectrum, as well as in luminophores and pigments.This thesis reports the information regarding one of the investigated non-quasi-polymeric sections for determining the coordinates of the initial crystallization spaces, isotherms, and monovariant curves in the *quasi-ternary system* (Ga_2S_3-$(Y_2O_2S)_{0.50}(Tb_2O_2S)_{0.50}$). The samples in the section were synthesized by a ceramic method from the initial components and investigated through physico-chemical methods (DTA, RFA, MQ, measurement of microhardness, density) after processing at 1150K temperature. Based on the findings obtained, the phase diagram of non-quasi-binary section Ga_2S_3-$(Y_2O_2S)_{0.50}(Tb_2O_2S)_{0.50}$ is set below. Liquidus in the phase diagram of the section Ga_2S_3 – $(Y_2O_2S)_{0.50}(Tb_2O_2S)_{0.50}$, is composed of two branches intersecting where the section crosses the monovariant curve at the intersection point and reflecting in the initial crystallization region $\gamma(Ga_2S_3$ and $\alpha[(Y_2O_2S)_{1-x}$ $(Tb_2O_2S)_x]$ of solid solutions. Hence, in Ga_2S_3-rich space, as Ga_2S_3 – $(Y_2O_2S)_{0.50}(Tb_2O_2S)_{0.50}$ crosses the monovariant curve, the initial crystallization space $\gamma(Ga_2S_3)$ is reflected in the liquidus. The binary crystallization $m+\alpha+\gamma$ reflects a wider density interval in the phase diagram of the section. Hence, the process starts with Kl (TOP curves) and ends with Kl^1 (Bottom curves). In the subsolidus of non-quasi-binary section $\alpha+\beta$ mixture decomposes (breakdowns) at 300K. Thus, Y_2O_2S - Ga_2S_3 - Tb_2O_2S is the quasi-ternary system of the above-mentioned section of the non-quasi-binary system. The *cathodoluminescence properties* of $(Ga_2S_3)_{1-x}(Y_2O_2S)_{x-y}(Tb_2O_2S)_y$ composition have been studied from the region where the applied section intersects the Ga_2S_3 -rich ternary solid solutions space. To measure a relative lighting in the samples, an electron ray tube connected to an electron-optical system (EOS) with an oxide cathode has been used as a cathode excitement. The electron flow energy is 200 keV. As can be seen from the spectrum, several groups of narrow band radiation $^5D_3 \rightarrow {}^7F_6$ (385 nm), $^5D_3 \rightarrow {}^7F_5$ (420 nm), $^5D_3 \rightarrow {}^7F_4$ (440 nm), $^5D_3 \rightarrow {}^7F_3$ (462 nm), $^5D_3 \rightarrow {}^7F_2$ (470 nm), $^5D_4 \rightarrow {}^7F_6$ (500 nm), $^5D_4 \rightarrow {}^7F_4$ (583 nm), $^5D_4 \rightarrow {}^7F_3$ (625 nm), were observed in the wavelength of 350 ÷ 620 nm. This is due to the transition from $^5D_3$ *and* ^5D level to the inner ^7F_j stark level of Tb^{3+} ion. $(Ga_2S_3)_{1-x}(Y_2O_2S)_{x-y}(Tb_2O_2S)_y$ solid solutions can be used in the production of osillographs, TV screens, electron microscopes, and other radiation devices, as *cathodoluminescence* material emitting the green color.