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Formation of the solid solution in the system Ag_2O-Sb_2O_3-MoO_3 on heating

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Abstract

In this paper, it consider compounds based on silver antimonate, which are formed by partial replacement of pentavalent antimony ions with hexavalent molybdenum ions, synthesized by the solid-phase reaction method. The features of thermolysis of compositions with different molar ratios in the $AgNO_3$-Sb_2O_3-MoO_3 system were studied by heating in air under conditions of temperature changes in wide range from 300 to 1023 K. The gross compositions of solid phase synthesis products are determined by methods of derivatography combined with qualitative X-ray phase analysis. The homogeneous region of the formation of solid solutions $Ag_{2-x}Sb_{2-x}Mo_xO_6$ with the defect pyrochlore-type structure in the concentration range $0.0 \leq x \leq 2.0$ was detected for a final synthesis temperature 1023 K. In the spatial group *Fd-3m* constraints, the Rietveld method was used to refine the structural parameters (the coordinates and the ion population over the crystallographic positions, the unit cell parameters), and the composition of the resulting pyrochlore phases with structural disorder. For ceramic samples sintered at 1173 K, the relative density and average particle size were determined.

References

[1] I.A. Stenina, A.B. Yaroslavtsev. Low- and intermediate-temperature proton-conducting electrolytes. Inorgan. materials. **2017**. Vol.53. No.3. P.253-262. (russian)
[2] S. Nikodemski, J. Tong, R. O'Hayre. Solid-state reactive sintering mechanism for proton conducting ceramics. *J. Solid State Ionics.* **2013**. Vol.253. P.201-210.
[3] Yu.A. Lupitskaya, V.A. Burmistrov. Ionic conductivity of potassium antimonate tungstates with partial Na + or Li+ substitution for K+. *Inorganic materials.* **2013**. Vol.49. No.9. P.930-934. (russian)
[4] A.A. Il'ina, I.A. Stenina, G.V. Lysanova, A.G. Veresov, A.B. Yaroslavtsev. Silver magnesium molybdate and silver cobalt molybdate: synthesis and ionic conductivity. *Russian journal of inorganic chemistry.* **2006**. Vol.51. No.6. P.960-965. (russian)
[5] V.A. Burmistrov, D.A. Zakharievich. Ion-conducting defect pyrochlore phases in the K_2O-Sb_2O_3-WO_3 system. Inorganic materials. **2003**. Vol.34. No.1. P.68-71. (russian)
[6] Yu.A. Lupitskaya, V.A. Burmistrov, D.A. Kalganov. Structure and ionic conductivity of solid solutions in the K_2CO_3-$AgNO_3$-Sb_2O_3-MeO_3 system (Me = W, Mo). *Journal of surface investigation: x-ray, synchrotron and neutron techniques.* **2015**. Vol.9. No.3. P.624-629. (russian)
[7] M.I. Pantyukhina, A.V. Kalashnova, and S.V. Plaksin. Electric properties of $Li_{2-2x}Sr_xZrO_3$ solid solutions. *Butlerov Communications.* **2014**. Vol.40. No.11. P.132-136. ROI: jbc-02/14-40-11-132
[8] F.A. Yaroshenko, V.A.Burmistrov, and K.S. Makarov. Dielectric relaxation of polymer composits based on a MF-4SK membrane and polyantimonic acid. *Butlerov Communications.* **2017**. Vol.49. No.2. P.88-95. ROI: jbc-02/17-49-2-88