

The study of the stable triangle NaF-KI-K₂MoO₄ and the stable tetrahedron NaF-KF-KI-K₂MoO₄ of the quaternary reciprocal system Na,K||F,I,MoO₄

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Keywords: differential thermal analysis, T-x diagram, eutectic, phase equilibria, X-ray diffraction.

Abstract

Functional materials on the basis of multicomponent systems from halogenides, chromates and molybdates of s1-elements find broad application in various fields of science and technology, for example, as electrolytes for chemical sources of current, heat-retaining materials, the phase transition of heat carriers, environments for cultivation of monocrystals, refractory coverings with the set properties, gumboils for welding and the soldering. Systematic studying of multicomponent systems from halogenides, chromates and molybdates of alkaline metals allows to receive a range of the electrolytes necessary for practical application and creation of the new engineering procedures based on use of ionic fusions. Oxygen-containing compositions of alkaline metals are poorly studied and therefore are perspective in respect of receipt of new salt compositions.

Splitting the four-component reciprocal system Na,K||F,I,MoO₄ is carried out with use of data elements by creation of a matrix of contiguity for system and the solution of the logical equation which is worked out on the basis of this matrix. As a result of splitting the tree of phases of system consisting of seven stable tetrahedrons connected among themselves by stable secants triangles. The object of a research is received the triangle of NaF-KI-K₂MoO₄ and a stable tetrahedron of NaF-KF-KI-K₂MoO₄ of the four-component reciprocal system Na,K||F,I,MoO₄ were a secant. Planning of an experiment in system is carried out according to rules of a projective thermographic approach. Phase balances in systems were studied by method of the differential thermal analysis, and carried out confirmation of the crystallizing phases with use of the X-ray phase analysis.

In secants a triangle and a stable tetrahedron such characteristics as structure, temperature of melting and an enthalpy of melting of the eutectic points were determined. Structure of an eutectic in secants NaF-KI-K₂MoO₄ triangle: NaF – 9%, KI – 45.5%, K₂MoO₄ – 45.5%, at a temperature of melting of 545 °C. Structure and temperature of melting of the eutectic points in a stable tetrahedron of NaF-KF-KI-K₂MoO₄: 6% – NaF, 52% – KI, 19% – K₂MoO₄, 23% – KF and 526 °C, and also 6.5% – NaF, 45.6% – KI, 9.9% – K₂MoO₄, 38% – KF and 529 °C respectively.

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Full Paper

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