

Thermodynamic investigation of relations between equilibrium compositions of phases at hydrochemical synthesis of solid solutions {AgCl, AgBr}(s)

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Abstract

The object of investigation is new, more advanced in handling, method of hydrochemical synthesis of solid solutions {AgCl, AgBr}(s), which are used as a demanded raw material at growth of monocrystals for the IR-fiber optics. It is based on the phenomenon of solid solution formation under isothermal interaction of individual AgCl(s^o) and/or AgBr(s^o) with the liquid mixture of hydrochloric and hydrobromic acids {H₂O, HCl, HBr}(l), and we named it the method of acid influence on individual halides (AIIH).

For the creation of method AIIH scientific foundation, which provides theoretical account and strict implementation of formation conditions of solid solutions {AgCl, AgBr}(s) with required relative contents of components, it is necessary to determine the relations between equilibrium component compositions of solid solution and liquid phase in analytical form.

Thermodynamic investigation of the mentioned relations has a complex nature and includes the following main stages: the introduction of the concept of hydrochemical system (HCS) and consideration of it's composite parts; the construction of stoichiometric models of inphase chemical transformations and interphase mass-exchange processes in HCS in terms of basic reactions; the consideration of thermodynamic laws of equilibrium of such reactions; the determination of activity coefficients in analytical form and determining the temperature dependences of equilibrium constants.