LOW-MELTING SALT MIXTURES DATA: ERRORS IN CONCENTRATION COORDINATES

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Before to use in practice or to place in the data bank the information on the low-melting salt mixture coordinates one needs to evaluate the accuracy of these experimental results. A lot of invariant points coordinates in the multicomponent salt systems have been got with the help of the so-called projection method of the thermal analysis. It means to use the specially chosen vertical sections of the multidimensional phase diagrams and to fix there a direction for the next polythermal section or to find an invariant point projection as the cross-section of two originating segments of the ruled (hyper)surfaces. As a result a data evaluation means to estimate every time the errors of the used points concentration coordinates.

For the first time these ideas were formulated for the ternary systems [1] and checked mainly in molybdate and tungstate systems [2]. Later the same was made for the quaternary phase diagrams of different topological types [3-5].

In many cases all hypersurfaces of the multidimensional phase diagram may be depicted by one-dimensional linear contour and simulated as skewed hyperplanes of different types. When it is a diagram's ruled hypersurface, its generating simplex is parallel to diagram's base. When liquidus, solidus and solvus hypersurfaces were approximated, then generating simplex of skewed hyperplane wasn't horizontal.

In T-x-y-z diagrams two types of the skewed hyperplanes are used: with one-dimensional and with two-dimensional generating simplexes. For the unruled hypersurfaces (like liquidus etc.) it is a six-power equation derived when one-dimensional simplex slides along two skewed planes of the four-dimensional space. The same equation (but with some zero coefficients) simulates the ruled hypersurface, generated by a horizontal segment of three-phase equilibrium in binary system.

An equation of third power for skewed hyperplane with two-dimensional generating simplex and three directing lines simulates other type of ruled hypersurface produced by four-phase equilibrium in ternary system. Its x-y-z projection resembles a trigonal prism or truncated pyramid with five faces.

Besides the invariant points coordinates evaluation as a polyhedron (hyper)volume of the same dimension as the concentration simplex, the additional recommendations have been formulated to get the more accurate data.

References

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Supported by the Russian Foundation for Basic Research Grant 01-03-32906.