

Modeling of the Thermodynamics of the Pseudobinary RbCl-GdCl₃ System

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The Gibbs energies of formation of the pseudobinary compounds Rb₃GdCl₆(s) and RbGd₂Cl₇(s) from the constituent metal halides, determined by Knudsen effusion mass spectrometry, were compared with the thermodynamic properties of the solid and liquid phases of the RbCl-GdCl₃ system, obtained by different methods. The compatibility of the results obtained in this work for pseudobinary compounds with literature data was assessed by an optimization procedure using the CALPHAD method. The liquid phase in the RbCl-GdCl₃ system was described by the associate model. The phase diagram, thermodynamic functions of mixing of the system studied, and the Gibbs energies of formation of the pseudobinary compounds: Rb₂GdCl₅(s), Rb₃GdCl₆(s), and RbGd₂Cl₇(s) resulted from this optimization procedure.

Key words: Coupled Phase Diagram; Rubidium Chloride-Gadolinium Chloride System; Thermodynamic Functions of Mixing; Thermodynamic Properties.