

Phase Diagram and Electrical Conductivity of CeBr_3 -KBr

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This paper continues our research program on lanthanide halide-alkali metal halide systems. Differential scanning calorimetry (DSC) was used to investigate the phase equilibria of the CeBr_3 -KBr system. This system is characterized by the two congruently melting compounds K_3CeBr_6 and K_2CeBr_5 and the three eutectics located at the CeBr_3 mole fractions 0.193 (837 K), 0.295 (855 K) and 0.555 (766 K). K_3CeBr_6 forms at 775 K and melts congruently at 879 K with the related enthalpies 54.5 and 41.7 kJ mol⁻¹, respectively. K_2CeBr_5 melts congruently at 874 K with the enthalpy 82.4 kJ mol⁻¹. The electrical conductivity was measured of all CeBr_3 -KBr mixtures and of the pure components down to temperatures below solidification. The experimental determinations were conducted over the entire composition range in steps of about 10 mol%. The specific electrical conductivity decrease with increasing CeBr_3 concentration, with significantly larger conductivity changes in the potassium bromide-rich region. The results are discussed in terms of possible complex formation.

Key words: Cerium Bromide; Potassium Bromide; Phase Diagram; Electrical Conductivity; Differential Scanning Calorimetry.