

Systematic Studies of Phase Relation and Thermodynamic Stability of Ln-Rh-O System for Catalysis and Electrochemical Devices

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Abstract: *Ln-Rh-O systems show potential interest in different catalytic applications. Phase diagram of these systems revealed that only LnRhO₃, an orthorhombic perovskite structure, has been found as stable ternary oxide. Employed solid-state electrochemical cell to determine the thermodynamic parameters of LnRhO₃ compounds from their binary oxides Rh₂O₃ and Ln₂O₃. Calcia stabilized and yttria stabilized zirconia has been used as solid electrolytes in these cells. Ternary phase relation for Ln-Rh-O systems is established using isothermal equilibration technique. Phase diagram of few Ln-Rh-O systems are computed with the help of supplementary data for other binary phases (Ln-Rh) from the literature and thermodynamic data for LnRhO₃ from experiment at high temperature. At 298.15 K, ΔH_f^0 and S^0 for LnRhO₃ are calculated from its constituting elements. Thermodynamic data has been used to compute an oxygen potential – composition and three-dimensional chemical potential diagram for the system Ln-Rh-O.*

Keywords: Catalytic Applications

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