THERMAL STABILITY OF $PrMnO_3$ AND $PrMn_2O_5$ PEROVSKITES IN REDUCING ATMOSPHERE

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The perovskite-like double oxides $PrMnO_3$ and $PrMn_2O_5$ and materials based on them have sufficiently high values of electrical conductivity and catalytic activity and can be used as materials for catalytic reactions. The specifics of the operation of these materials are constrained by the lack of necessary data to select synthesis modes that preserve their chemical and phase composition, and as a result, their properties. Obtaining such data requires thermodynamic analysis of oxides to determine the conditions of their chemical stability over a wide range of temperatures and oxygen pressures.

The thermal properties of the samples were studied using a dynamic method on a synchronous thermal analysis device STA 449 F3 using an attachment for regulating the partial pressure of oxygen in gaseous atmospheres. The experiment was carried out when heated from room temperature to 1000°C. Based on experimental data, the range of thermal stability of the crystal structure of the orbitally disordered *O*-phase of $PrMnO_3$ oxide was determined at an oxygen pressure in a gaseous medium $P(O_2) = 0.21$ atm. Analysis of changes in the oxygen content in $PrMnO_3$ and $PrMn_2O_5$ oxides when heated in a reducing atmosphere $P(O_2) = 10^{-23.5}$ atm allowed us to establish the sequence of changes in their phase composition and calculate the content of ions of various manganese. The temperature dependences of the equilibrium oxygen pressure for the reduction reactions of $PrMnO_3$ and $PrMn_2O_5$ oxides were obtained using the static method of studying heterogeneous equilibria in the Pr-Mn-O system:

$$PrMnO_3 = 1/2\ Pr_2O_3 + MnO + 1/4O_2,$$
$$PrMn_2O_5 = PrMnO_3 + 1/3\ MnO + 1/3O_2.$$

The thermal stability of oxides is determined by the reactions of oxygen exchange with a gaseous medium. Based on experimental data thermodynamic characteristics of the reactions of oxide dissociation and their formation from elements have been obtained.

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