INFLUENCE OF TEMPERATURE AND OXYGEN PRESSURE ON THE STABILITY OF BARIUM-SUBSTITUTED NEODYMIUM MANGANITES

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The practical value of the $Nd_{1-x}Ba_xMnO_{3\pm\delta}$ manganites (x = 0.0; 0.15; 0.25) is related to the perspective of their use in electrochemical and catalytic applications. Another factor that draws attention to these materials is the manifestation of competing charge, spin, orbital, and lattice interactions. An important role in changing these properties is played by the electronic state of manganese, a change in the oxygen nonstoichiometry of compounds under the influence of external parameters – temperature, oxygen pressure of the gas atmosphere. The purpose of the work is to determine the boundaries of the thermal stability of neodymium manganites, the evolution of phase equilibria at variable temperature and oxygen pressure with changes in the concentration of barium. The stability of these complex oxides was studied by two methods: dynamic and static. Upon linear heating (dynamic method, $P(O_2)$ = 0.21 atm.), the $NdMnO_3$ and $Nd_{0.85}Ba_{0.15}MnO_3$ manganites undergo a phase transformation of the Jahn-Teller nature from an orbitally ordered *O'* - phase to an orbitally disordered *O* - phase. The temperature of this transition decreases upon substitution with barium. In the substituted Ba manganite at a concentration of x = 0.25, the transition $O' \rightarrow O$ is provided by the substitution level and fixed at room temperature. Partial substitution of neodymium for barium expands the range of thermal stability of the crystal structure of the high-temperature *O* - phase of manganites. The largest range is found in manganite $Nd_{0.75}Ba_{0.25}MnO_3$. The evolution of phase equilibrium states in neodymium manganite samples has been established with a decrease in the partial pressure of oxygen in a gaseous atmosphere to $P(O_2) = 10^{-22.5}$ atm. The dissociation of the $NdMnO_3$ sample occurs in one stage and ends with the formation of Nd_2O_3 and MnO oxides. A two-stage sequence has been established for barium-substituted samples. It includes an intermediate stage of the formation of complex neodymium oxides. According to the data of the static method of investigation of heterogeneous equilibria in manganites, thermodynamic characteristics of reactions of dissociation of oxides and their formation from elements were obtained.

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