

ELECTRICAL CONDUCTIVITY OF COMPLEX OXIDES OF $\text{LnM}^{\text{II}}\text{CoO}_{3,5}$ (Ln – La, Er, Gd, Yb, Tb, M^{II} – Mg, Ca, Sr, Ba) COMPOSITION

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During the operation of power plants on fuel cells high requirements are made to cathode materials, which must have high electronic conductivity, and developed porous structure “three-phase boundary (cathode material-air-electrolyte)”. They should not be oxidized at high partial oxygen pressures, and do not interact with the electrolyte material. Complex oxides with a perovskite structure are promising as cathode materials for fuel cells [1].

In order to search for new phases formed in $\text{Ln}_2\text{O}_3 - \text{Me}^{\text{II}}\text{O} - \text{CoO}$ (Ln – rare-earth, M^{II} – alkaline-earth) systems, that are promising as solid electrolytes and cathode materials, there was made the investigation of the temperature dependence of the electrical resistance of complex oxides of the composition $\text{LnM}^{\text{II}}\text{CoO}_{3,5}$, where (Ln – La, Er, Gd, Yb, Tb, M^{II} – Mg, Ca, Sr, Ba). Using the dependence of the resistance from the temperature, the activation energies of the conductivity for new compounds have been determined.

Investigation of the electrical conductivity of new compounds has shown the presence of mixed electrical conductivity. The character of the dependence of the conductivity at average temperatures shows their thermal activation, in the Arrhenius coordinates these sections of the graph are described by a straight line. Thermally activated holes, electrons, and ions can be the carriers of electric current in these sections.

References:

1. MOSHNIKOV, V.A., TERUKOV, E.I. 2010. *Fundamentals of hydrogen energy*. Saint-Petersburg: SPbGETU «LETI»