Effect of Starting Materials on the Characteristics of $(La_{1-x}Sr_x)Mn_{1+y}O_{3-\delta}$ Powder Synthesized by GNP

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ABSTRACT

We synthesized $(La_{1-x}Sr_x)MnO_3$ as a cathode for SOFC by glycine nitrate process(GNP) and knew the different properties of $(La_{1-x}Sr_x)MnO_3$ by using nitrate solution and oxide solution as a starting material. In case of using nitrate solution as a starting material, main crystal phase peak of $LaMnO_3$ increased as Sr content added up and a peak of Sr_2MnO_4 and La_2O_3 was showed as a secondary phase. We added Mn excess to control a crystal phase. In this case, the electrical conductivity had a high value 210.3S/cm at 700℃.

On the other side, when we used oxide solution as a starting material, we found main crystal phase of $LaMnO_3$ to increase as Sr content added up and a peak of La_2O_3 as a secondary phase. Similary, we added Mn excess to control a crystal phase in this case. We knew $(La,Sr)MnO_3$ powder to sinter well and the electrical conductivity of the sintered body at 1200℃ for 4hrs was 152.7s/cm at 700℃.

The sintered $(La,Sr)MnO_3$ powder at 1000℃ for 4hrs got the deoxidization peak, depending on the temperature and in case of using nitrate solution as a starting material, the deoxidization peak was showed at 450℃ which is lower than used a oxide solution as a starting material.

As a result, when $(La,Sr)MnO_3$ powder was synthesized to add Mn excess and to use nitrate solution as a starting material, we found it to have the higher deoxidization property and considered it as a cathode for SOFC properly. And we found it to have different electrical conductivity the synthesized (La,Sr)MnO3 powder by using different starting materials like nitrate solution and oxide solution which influence a sintering density and crystal phase.