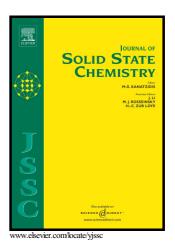
Author's Accepted Manuscript

ROLE OF Sm CONTENT TO THE CRYSTAL STRUCTURE AND PROPERTIES OF $Sr_{1-x}Sm_xFeO_{3-\delta}$

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PII: S0022-4596(18)30328-1

DOI: https://doi.org/10.1016/j.jssc.2018.08.007

Reference: YJSSC20325

To appear in: Journal of Solid State Chemistry

Received date: 26 June 2018 Revised date: 6 August 2018 Accepted date: 8 August 2018

Cite this article as: N.E. Volkova, L.V. Khvostova, L.Ya Gavrilova and V.A. Cherepanov, ROLE OF Sm CONTENT TO THE CRYSTAL STRUCTURE AND PROPERTIES OF Sr_{1-x}Sm_xFeO_{3-δ}, *Journal of Solid State Chemistry*, https://doi.org/10.1016/j.jssc.2018.08.007

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ROLE OF Sm CONTENT TO THE CRYSTAL STRUCTURE AND PROPERTIES OF

$Sr_{1-x}Sm_xFeO_{3-\delta}$

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Abstract:

Single phase $Sr_{1-x}Sm_xFeO_{3-\delta}$ solid solutions were synthesized at $1100^{\circ}C$ in air within the two ranges $0.05 \le x \le 0.50$ (with the cubic structure, sp. gr. Pm3m) and $0.85 \le x \le 1.0$ (with the orthorhombic structure, sp. gr. Pbnm). The structural parameters were refined by the Rietveld analysis. The influence of samarium content in $Sr_{1-x}Sm_xFeO_{3-\delta}$ on the oxygen nonstoichiometry, thermal expansion and electrical conductivity has been studied. Gradual substitution of strontium by samarium ions leads to the increase in oxygen content. Electrical conductivity and thermal expansion of solid solutions decrease on doping. The maximum conductivity value equal to 240 S/cm was obtained for $Sr_{0.9}Sm_{0.1}FeO_{3-\delta}$ at $300^{\circ}C$ in air. The positive value of Seebeck coefficient indicates predominant p-type conductivity in $Sr_{1-x}Sm_xFeO_{3-\delta}$. Chemical reactivity of $Sr_{1-x}Sm_xFeO_{3-\delta}$ in contact with the solid electrolyte materials $Ce_{0.8}Sm_{0.2}O_2$ and $Zr_{0.85}Y_{0.15}O_2$ was examined within the temperature range of $800-1100^{\circ}C$ in air.

Graphical Abstract

Total conductivity of $Sr_{1-x}Sm_xFeO_{3-\delta}$ (x =0; 0.1; 0.3; 0.5) in air vs. temperature (cooling/heating rate 2°/min).

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