УДК 537.9

THE FACTORS AFFECTING IONIC CONDUCTIVITY IN $La_2Mo_{2-x}V_xO_{9-\delta}$ ($0 \leq x \leq 0.100$): XRD AND RAMAN STUDIES

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In this paper we report the structural and Raman spectroscopy analyses of $La_2Mo_{2-x}V_xO_{9-\delta}$ ($0 \leq x \leq 0.100$). *Rietveld refined XRD patterns show that La-O1, La-O2, La-O3 and the average La-O bond length of lanthanum-oxygen polyhedral decrease with vanadium content. A clear correlation was found between ionic conductivities and Mo-O bond length variation with dopant concentration. The composition* $x = 0.050$ *had the shortest O2-O3 and O3-O3 bond lengths and the highest conductivity. The La-La-La angle of [O1LaMo] anti-tetrahedral unit is maximum at* $x = 0.050$*, allowing increased O2 and O3 ion mobilities. The Raman spectra shows, the Mo-O bond length alterations as a function of the doping concentration and are in good agreement with the results obtained from X-Ray results.*

Keywords: RT-XRD, phase transition, Raman spectra, $La_2Mo_{2-x}V_xO_{9-\delta}$ ($0 \leq x \leq 0.100$).

1. Introduction. Fast oxide-ion conductors have several potential applications in electrochemical devices such Solid Oxide Fuel Cell (SOFC), oxygen separation membranes, and gas sensors [1, 2]. One of such oxygen ion conductor, $La_2Mo_2O_9$, has been discovered by Lacorre et al. [3]. The ionic conductivity of $La_2Mo_2O_9$ increases by two orders of magnitude due to a structural phase transition at 580 °C from monoclinic (α) to cubic (β). Around...

Поступила в редакцию 26 декабря 2022 г.
После доработки 30 марта 2023 г.
Принята к публикации 31 марта 2023 г.

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