

Produce new solid electrolytes based on the $\text{Li}_{8-x}\text{Zr}_{1-x}\text{V}_x\text{O}_6$ system

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Abstract

The region of existence of solid solutions in the $\text{Li}_{8-x}\text{Zr}_{1-x}\text{V}_x\text{O}_6$ system, where $0 \leq x \leq 0.01$, was determined. The heterovalent doping of the Li_8ZrO_6 phase into the zirconium sublattice by the Li_7VO_6 phase results in significant increase in the solid solutions conductivity. The $\text{Li}_{7.99}\text{Zr}_{0.99}\text{V}_{0.01}\text{O}_6$ solution has the highest value of conductivity ($4.1 \cdot 10^{-1}$ S/cm) at 873 K. The fraction of electronic conductivity in the $\text{Li}_{7.99}\text{Zr}_{0.99}\text{V}_{0.01}\text{O}_6$ sample does not exceed 0.1% of the total conductivity value at 873-673 K. The solid solutions of the $\text{Li}_{7.99}\text{Zr}_{0.99}\text{V}_{0.01}\text{O}_6$ composition were found to be stable in contact with lithium at temperatures above 533 K. Thus, they may be used as solid electrolytes for lithium chemical power sources.