CONDUCTIVITIES AND PHASE RELATIONSHIP OF $Na_{1+x}Zr_2Si_xV_yP_{3-x-y}O_{12}$ FAST ION CONDUCTORS

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$Na_{1+x}Zr_2Si_xV_yP_{3-x-y}O_{12}$ fast ion conductors were synthesized from mixtures of Na_3PO_4-ZrO_2-SiO_2-V_2O_5 in platinum vessel at temperatures of 900 - 1200°C. Like $Na_{1+x}Zr_2Si_xP_{3-x}O_{12}$ system and $Na_{1+x}Hf_2Si_xP_{3-x}O_{12}$ system, the R3C and C2/sc solid solution can be formed in the $Na_{1+x}Zr_2Si_xV_yP_{3-x-y}O_{12}$ system with a wide composition range. The phase relationship was identified by X-ray diffraction. The limit of composition range for single V-NASICON phase has been explored and will be presented.

The electrical conductivities and activation energies of $Na_{1+x}Zr_2Si_xdV_yP_{3-x-y}O_{12}$ system were measured by a.c. impedance technique on sintered discs from room temperature to 400°C. The maximum conductivity is $0.66 \times 10^{-1} (\Omega\,cm)^{-1}$ at 350° and the activation energy is 25.85 KJ/mole. Some other properties will be presented and correlated with composition change.