STUDY OF Ti-Zr-NASICON SYSTEM

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Ti-Zr-NASICONs have been prepared by high temperature solid reactions of using Na_3PO_4-ZrO_2-TiO_2-SiO_2 mixtures. The results indicated that the reaction temperatures of Ti-Zr-NASICON is lower than that of Zr-NASICON. Like Zr-NASICON, THE R3C and C2/o solid solution can be formed in the Ti-Zr-NASICON SYSTEM. The phase composition has been identified by X-ray diffraction.

The electrical conductivities of Ti-Zr-NASICON have been measured by a.c. impedance technique on sintered discs from room temperature to 400°C. The results showed that $Na_{1+x}ZrTiSi_xP_{3-x}O_{12}$ fast ion conductors have higher conductivities than that of $Na_{1+x}Zr_2Si_xP_{3-x}O_{12}$ when $x \leq 2.0$. The best one is the initial composition with x=0.9, i.e. $Na_{1.9}ZrTiSi_{0.9}P_{1.1}O_{12}$, its conductivity is $1.25 \times 10^{-1} (\Omega.cm)^{-1}$ at 350°C and the activation energy is 20.5KJ/mole in the temperature range of 200 - 400°C. Some other properties were examined, too. Those results wwill be presented.