

# **$^{23}\text{Na}$ NMR Study of NASICON-type Compounds, $\text{Na}_{1+x}\text{Sc}_x\text{Ti}_{2-x}(\text{PO}_4)_3$**

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The structure of NASICON-type compounds,  $\text{Na}_{1+x}\text{Sc}_x\text{Ti}_{2-x}(\text{PO}_4)_3$  ( $0 \leq x \leq 2$ ), and the dynamics of  $\text{Na}^+$  have been investigated by  $^{23}\text{Na}$  NMR spectroscopy. It was found that the  $^{23}\text{Na}$  1D and 2D MQMAS spectra depend on the Na concentration, suggesting strongly that the  $\text{Na}^+$  ions are distributed between two crystallographically nonequivalent sites, one is a special position with axial symmetry, and the other a position of low symmetry. The chemical exchange between these different sites in the crystal takes place at room temperature, which may cause the high Na ion conduction of this material.

*Key words:* NASICON; Superionic Conductor; 2D MQMAS NMR; Chemical Exchange.