INFLUENCE OF PROTON EXCHANGE ON NMR RELAXATION MECHANISM OF ^{7}Li

A.I. Ovcharenko, E.D. Chesnokov, I.G. Vertegel, L.S. Ivanova, Yu.P. Gnatenko

Institute of Physics, Nat. Acad. of Sci. of Ukraine
(*46, Nauky Ave., Kyiv 03680, Ukraine*)

S u m m a r y

The temperature dependence of the ^{7}Li spin-lattice relaxation time in the temperature interval 170–340 K has been studied in undoped and proton-exchanged powder specimens of $LiNbO_3$. An anomaly in the temperature behavior of the relaxation time T_1 in the temperature interval 300–340 K is revealed in both specimens, which is related to the local lattice reconstruction. On the basis of the activation energy values calculated from the $T_1(T)$ dependence, a conclusion is made that the dominant relaxation mechanism in the considered temperature interval is the tunneling of Li ions between sublattice vacancies. The difference between the activation energies for two polycrystals is explained by the transition from a symmetric three-well potential to an asymmetric one owing to the appearance of oxygen vacancies and the localization of impurity protons in the oxygen plane.