

High temperature phase transitions of LiRbSO_4 studied by MAS and MQMAS NMR of ^{87}Rb

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Solid-state nuclear magnetic resonance (NMR) of the ^{87}Rb has been employed to investigate the phase transitions in polycrystalline LiRbSO_4 . The spin-lattice relaxation time T_1 and the NMR line shape were measured using magic angle spinning (MAS) and multiple quantum magic angle spinning (MQMAS) methods between 373 K and 488 K. The quadrupole coupling constant, Q_{cc} , the asymmetry parameter, η , and the isotropic chemical shift δ_{CS} were determined from the analysis of MAS and MQMAS spectra. The anomalies of Q_{cc} near the IV-III phase transition were associated with the deformation of local environment of the Rb ions in the crystal lattice. The measurements of the spin-lattice relaxation rate as a function of temperature and Larmor frequency showed the existence of a damped soft mode near the V-IV and IV-III phase transitions.