

Solid-State ^{87}Rb NMR Study in Powdered RbMnCl_3

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RbMnCl_3 has received considerable attention in recent years due to its ferroelastic and optical properties. RbMnCl_3 has been found to undergo para-ferroelastic structural phase transition from a monoclinic with the space group C_{2h}^2 to a hexagonal structure with the space group D_{2h}^4 at $T_c(=272\text{K})$. Solid-state ^{87}Rb NMR spectroscopy is utilized for the detection of the structural phase transition at 290K in powdered RbMnCl_3 . Quadrupole coupling constants (e^2qQ/h) and the asymmetry parameters (η) for two physically nonequivalent Rb sites, Rb(I) and Rb(II), are determined from nonlinear least-squares fits to the ^{87}Rb powder patterns in the temperature range of 260K to 330K. Quadrupole parameters are examined for the detection of structural phase transition owing to the significant change in Rb(II) site. DSC and XRD data in RbMnCl_3 and ^{133}Cs NMR powder patterns in CsMnCl_3 are also carried out to confirm above results.