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Cr^{3+} NMR for Multiferroic Chromium spinel $ZnCr_2Se_4$ SEJUN PARK, Department of Physics, KAIST, SANGIL KWON, Institute for Quantum Computing, University of Waterloo, SOONCHIL LEE, Department of Physics, KAIST, SEUNGHYUN KHIM, DILIP KUMAR BHOI, KEE HOON KIM, CENSCMR, Department of Physics and Astronomy, Seoul National University — Multiferroic systems including $ZnCr_2Se_4$, the chromium spinel with helical spin structure, have been in huge interest for decades due to its physical variety and applicability. In the temperature range between 21K and 80K, this material shows negative thermal expansion. Due to the bond frustration, the spins of the chromium ions order helically below the transition temperature, 21K, though the exchange constant tends to make a ferro-order. The anomalous 1^{st} order-like magnetic transition is yet clarified and still an interesting topic. To probe microscopic origin of these features, we measured zero-field NMR of Cr^{3+} ions having nuclear spin 3/2. Six peaks were observed revealing Nuclear Quadrupole Resonance(NQR) and anisotropic hyperfine field at chromium sites. The NQR spectrum reveals that the structure is highly distorted below the magnetic transition temperature where the normal Jahn-Teller distortion is absent. Temperature dependence of the spectrum is also measured to obtain the magnetization as a function of temperature.

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