

# NMR study on $\text{Ba}_{0.5}\text{Sr}_{1.5}\text{Zn}_2(\text{Fe}_{0.92}\text{Al}_{0.08})_{12}\text{O}_{22}$

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We did zero-field NMR study on the annealed single crystal of multiferroic helimagnets  $\text{Ba}_{0.5}\text{Sr}_{1.5}\text{Zn}_2(\text{Fe}_{0.92}\text{Al}_{0.08})_{12}\text{O}_{22}$  (Al-BSZFO). This material shows extremely high magnetoelectric susceptibility so that the critical field for switching electric polarization is less than 1 mT below 90 K [1]. NMR frequency change by the temperature follows Bloch's  $T^{3/2}$  law which presents the low temperature excitation is ferromagnetic spin wave. The nuclear spin-lattice relaxation rate and the nuclear spin-spin relaxation rate were also measured. Both increased rapidly as the temperature increases above 60 K at which the spin structure changes from normal longitudinal cones (NLCs) to alternating longitudinal cones (ALCs) for the case of as-grown (not annealed) sample [2]. Due to rapid shortening of spin-spin relaxation time, the NMR signal intensity abruptly reduced above 60 K. We also studied rf pulse width and power dependence.

## 참고문헌

- [1] S. H. Chun et al., Phys. Rev. Lett. 104, 037204 (2010).
- [2] H. B. Lee et al., Phys. Rev. B 83, 144425 (2011).