

¹¹B-NMR study on Shastry-Sutherland system TbB₄

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The network of magnetic R ions in Rare-earth tetraborides RB₄ (R = La-Lu) is characterized by orthogonal dimers that is equivalent to the Shastry-Sutherland lattice (SSL) with magnetic frustration.¹ In RB₄ system, the coexistence of magnetic frustration, the quadrupole interactions and the RKKY interactions may result in a novel magnetic states. TbB₄ shows a large magnetization jump at $H=15.9\text{T}$ for $H//[100]$.² To investigate the change of the magnetic structure with this jump, we measured the field dependence of ¹¹B-NMR spectra at various resonant magnetic fields for $H//[100]$. Observed ¹¹B-NMR spectra showed a drastic change at $H=15.9\text{T}$, suggesting that the magnetic structure changes on the metamagnetic transition. We estimated the hyperfine field at each ¹¹B-site by the classical dipole-dipole interaction to reproduce the observed NMR spectra. With an assumption of a spin model in accordance with the magnetization jump, the calculated spectra showed a qualitative agreement with an observation.

¹B.S.Shastry et al., Physica B **208**, 1069 (1981).

²S.Yoshii et al., Phys. Rev. Lett **101**, 087202 (2008).