Investigation on Vortex Dynamics in YNi_2B_2C Superconductor using ^{11}B NMR

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^{11}B nuclear magnetic resonance(NMR) measurements have been performed on single crystals of YNi_2B_2C superconductor to investigate vortex dynamics as a function of temperature under various magnetic field values of 1.0, 1.8, 3.0, 4.0, and 8.0 T. The vortex dynamics are microscopically probed from measurements of shift, linewidth and transverse relaxation rate $1/T_2$ for the ^{11}B. The complete and extensive analysis of these data provides information about fluctuation time scale *Tc*, static distortion U_S and dynamic displacement U_D of flux-lines from the regular lattice points. Based on these data, three phases of vortices are identified.

NMR shift, linewidth and $1/T_2$ sensitively probe vortex dynamics pertaining to respective vortex phases. The change of vortex dynamics is reflected in temperature dependence of *Tc*, U_S, and U_D in each phase of vortices. Based on these data, three vortex phases are identified. In the temperature region above T/Tc = 0.92, ^{11}B NMR shift, linewidth and $1/T_2$ show almost no change from the respective values in the normal state, suggesting that the flux-lines behave like a liquid state. Below T/Tc = 0.3, vortices form a rigid lattice. In the intermediate region, vortices are found to form a hard glass phase for $0.3<T/Tc<0.6$ and a soft glass phase for $0.6<T/Tc<0.9$.