(P2-19)

NQR/NMR study on the heavy-Fermi liquid properties of $YbFe_4Sb_{12}$

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A heavy-lanthanide skutterudite compound $YbFe_4Sb_{12}$ is in an intermediate valence state and has a rather large Sommerfeld coefficient $\gamma(0) \sim 140$ mJ/mol·K^2 [1]. The magnetic susceptibility χ at high temperatures above $\sim$50 K follows the Curie Weiss-law with an effective magnetic moment of $\simeq 3.09\mu_B$ [1]. However, the temperature dependence of χ at low temperatures largely depends on the difference in the sample preparation procedures [1-5]. To elucidate the electronic and magnetic properties at a microscopic level, we have performed NQR and NMR measurements by using a $YbFe_4Sb_{12}$ specimen synthesized at high pressure that has the intermediate χ plateau around 50 K.

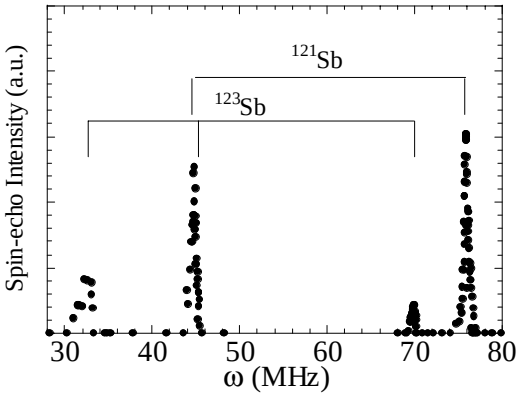

Figure 1: Sb-NQR spectrum in $YbFe_4Sb_{12}$ at 4.2 K.

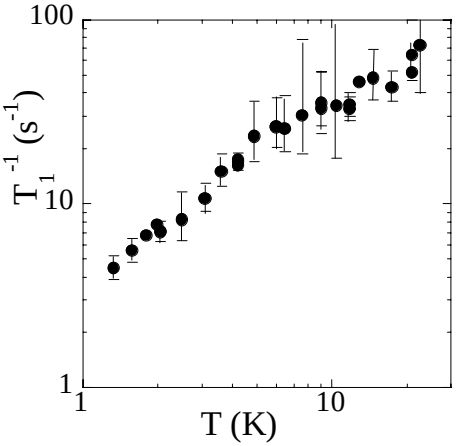

Figure 2: Temperature dependence of the Sb spin-lattice relaxation rate in $YbFe_4Sb_{12}$

The Sb-NQR spectrum in $YbFe_4Sb_{12}$ observed at 4.2 K is shown in Fig. 1, which is very similar to that observed in $LaFe_4Sb_{12}$ [6]. The values of the nuclear spin-lattice relaxation rate $1/T_1$ are protted in Fig. 2 against temperature. $1/T_1T$ exhibits a Curie Weiss-type increase down to $\sim$10 K followed by stauration behavior at low temperatures similar to those in $LaFe_4Sb_{12}$. The most important feature is that the values of $1/T_1T$ are less than those in $LaFe_4Sb_{12}$, suggesting that low-energy spin fluctuations in the RFe_4Sb_{12} (R = La and Yb) are not dominated by $4f$ spins of the R ion, but [Fe_4Sb_{12}] polyanions . More detailed results and analyses will be presented in the workshop.

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