$^{77}$Se NMR investigation of the paramagnetic metal phase of $\lambda$-(BETS)$_2$FeCl$_4$

GUOQING WU, W.G. CLARK, S.E. BROWN, UCLA Physics and Astronomy, J.S. BROOKS, NHMFL Tallahassee, A. KOBAYASHI, Res Ctr. Spectrochem., Univ. of Tokyo, Japan, H. KOBAYASHI, Inst. Mol. Science, Okazaki, Japan — We report $^{77}$Se NMR measurements of the spectrum and the spin-lattice relaxation rate ($1/T_1$) in a 7 µg single crystal of $\lambda$(BETS)$_2$FeCl$_4$ over the temperature ($T$) range 2.5-10 K in an applied field of 10.9 T parallel to the $a$-axis (paramagnetic metal phase). A behavior close to $1/T_1 = \text{constant}$ is observed. It indicates that for these conditions, $1/T_1$ is dominated by the hyperfine interaction between the $^{77}$Se spins and the conduction electrons, in contrast to $1/T_1$ for the protons, which is driven by the magnetic fluctuations of the Fe$^{3+}$ spins [W.G. Clark et al., Appl. Mag. Res. 27, 279 (2004)]. From these proton measurements, we estimate that the contribution of the Fe$^{3+}$ fluctuations to $1/T_1$ of $^{77}$Se is negligible. Work at UCLA was supported by NSF Grants DMR-0334869 (WGC) and DMR-0520552 (SEB).

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