

μ SR study of thiospinel CuCrZrS_4

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We report the results of μ SR study of thiospinel CuCrZrS_4 , which shows intriguing magnetic properties, such as ferromagnetic, $T_C \approx 60$ K, and re-entrant spin-glass, $T_f \approx 10$ K, behavior [1], and a large negative magnetoresistance [2]. In the first magnetic phase between T_f and T_C , no oscillations are shown in the time spectrum. When we apply a stretched exponential form to analysis of the zero-field spectrum, the exponent β is found to be decreased from $\beta \sim 1$ above T_C to $\beta \sim 0.5$ at T_f . In a longitudinal magnetic field dependence of the spectrum, a residual relaxation is observed even at high magnetic fields. These results indicate a development of unhomogeneous and dynamical internal fields due to short-range and/or partial ferromagnetic ordering below T_C . Around T_f , the relaxation rate of the muon depolarization is increased rapidly with the decrease of the temperature, implying a slowing down of fluctuating moments. We will discuss frustrate and/or competitive correlation of ferro- and antiferromagnetic interactions in this compound from the microscopic viewpoint.

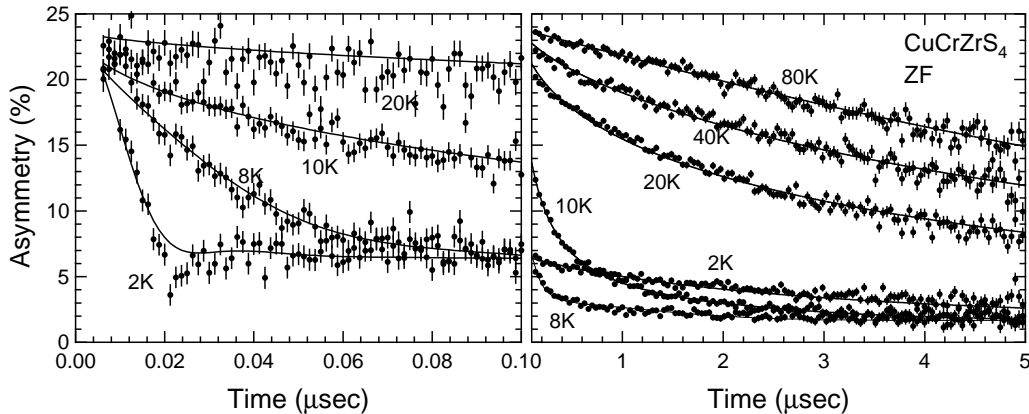


Fig. 1: Temperature dependence of the ZF- μ SR spectra.

[1] Y. Iijima et. al., Phil. Mag. 83, (2003) 2521. [2] T. Furubayashi et. al., Solid State Commun. 131 (2004) 505.