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ESR Study of Spin Dynamics for Organic spin-Peierls Systems

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In conventional cw-ESR measurements, spin dynamics of electron spin are usually discussed from the ESR linewidth. However, it is hard to estimate individual spin-spin and spin-lattice relaxation rate since the linewidth are composed of both contribution and also contain the inhomogeneous terms. On the other hand, pulsed-ESR measurements possess a great advantage since we can directly obtain such kind of parameters which are important to understand the electron spin dynamics in the solid-state functional materials.

Organic conductors, $(TMTTF)_2X$, are extensively studied materials and are well-known quasi-one-dimensional conductors possessing various ground states, such as spin-Peierls, antiferromagnetic and superconductivity states realized by the application of pressure or the variation of the counter-anion, X. [1]. $MEM(TCNQ)_2$ is also recognized as a typical one-dimensional spin-Peierls system.

Firstly, we investigate the spin-dynamics of the spin-Peierls systems comparing between the $(TMTTF)_2PF_6$ and the $MEM(TCNQ)_2$. Secondly, we introduce the curious temperature dependence of the ESR relaxation rate in the proximity of the ground states for the $(TMTTF)_2PF_6$ (spin-Peierls) and the $(TMTTF)_2Br$ (antiferromagnet). In this paper, we discuss the spin dynamics comparing these typical low-dimensional spin-systems in the proximity of the phase transition by cw- and pulse-ESR spectroscopy.

[1] T. Ishiguro, K. Yamaji and G. Saito, *Organic Superconductors*, Springer-Verlag (1998).