The spin-lattice magnetic relaxation of an *S*=1/2 copper(II)-substituted Keggin-type phosphotungstate

([1]*College of Humanities and Sciences, Nihon University*) ○Toshiharu Ishizaki, Yoji Inoue, Tomoji Ozeki

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Magnetic relaxation behaviors of 3d transition metal based *S*=1/2 systems have been attracted much attention owing to the intrinsic quantum properties and the long magnetic relaxation time.[1] In this presentation, the spin-lattice magnetic relaxation behavior of an *S*=1/2 copper(II)-substituted Keggin-type phosphotungstate $[(n\text{-}C_4H_9)N]_4H[PW_{11}O_{39}Cu]$ (**1**) is reported.

AC magnetic susceptibility measurements revealed that the polyoxometalate-based spin-1/2 system exhibits a slow magnetic relaxation in applied static magnetic field (H_{dc}) at low temperatures (Figure 1). The longest relaxation time of 260 ms was obtained at 1.8 K and in an applied H_{dc} of 3000 Oe for a 5% magnetically diluted powder of **1**, $[(n\text{-}C_4H_9)N]_4H[PW_{11}O_{39}Cu_{0.05}Zn_{0.95}]$ (**dil.1**). The value is larger than that for an *S*=1/2 monocopper(II)-substituted Keggin-type silicotungstate of 92 ms obtained at 1.8 K and in an H_{dc}=5000 Oe, and comparable to those of other *S*=1/2 systems with organic ligands that exhibits the spin coherence.[1,2] The relaxation time analysis indicates that the Raman spin-lattice magnetic relaxation process dominates at all measured temperatures in an H_{dc}=5000 Oe. The extracted Raman exponent *n* of 2.68 is smaller than *S*=1/2 systems with organic ligands, which implies the decrease in relaxation time at higher temperatures is likely to be moderate.[3]

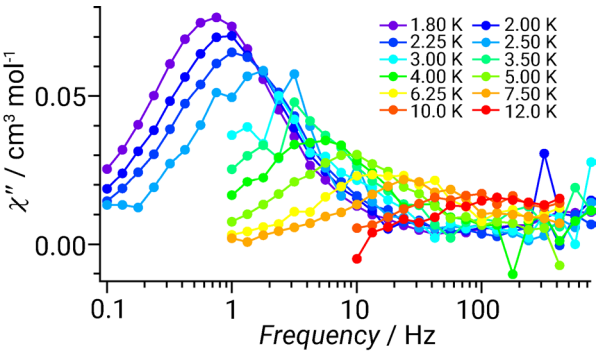

Figure 1 A plot of χ'' vs. ac frequency plot of **dil.1** in an applied static field of 5000 Oe at indicated temperatures.

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