Electronic Supplementary Material (ESI) for Dalton Transactions.

Electronic Supplementary Information

Tm based complexes undergoing slow relaxation of magnetization: exchange coupling and aging effects

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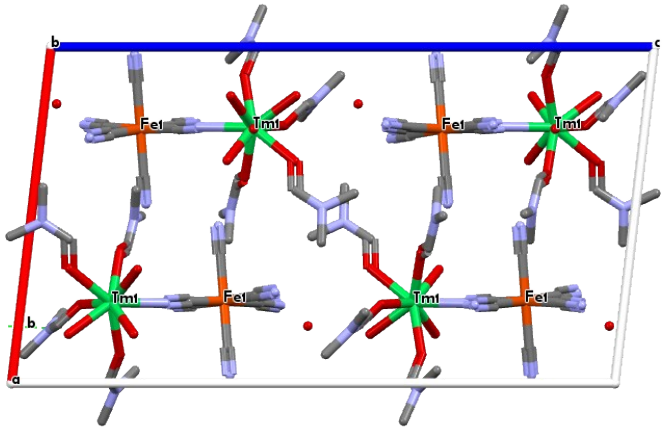

Fig. S1. Content of the unit cell of **1** and **2**

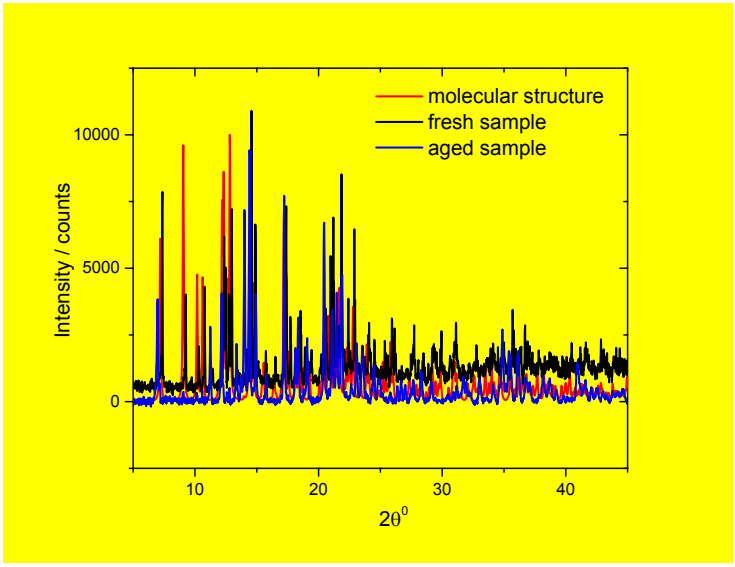

Fig. S2. Calculated PXRD spectrum of complex **1** and experimental of fresh (black trace) and aged sample (blue trace)

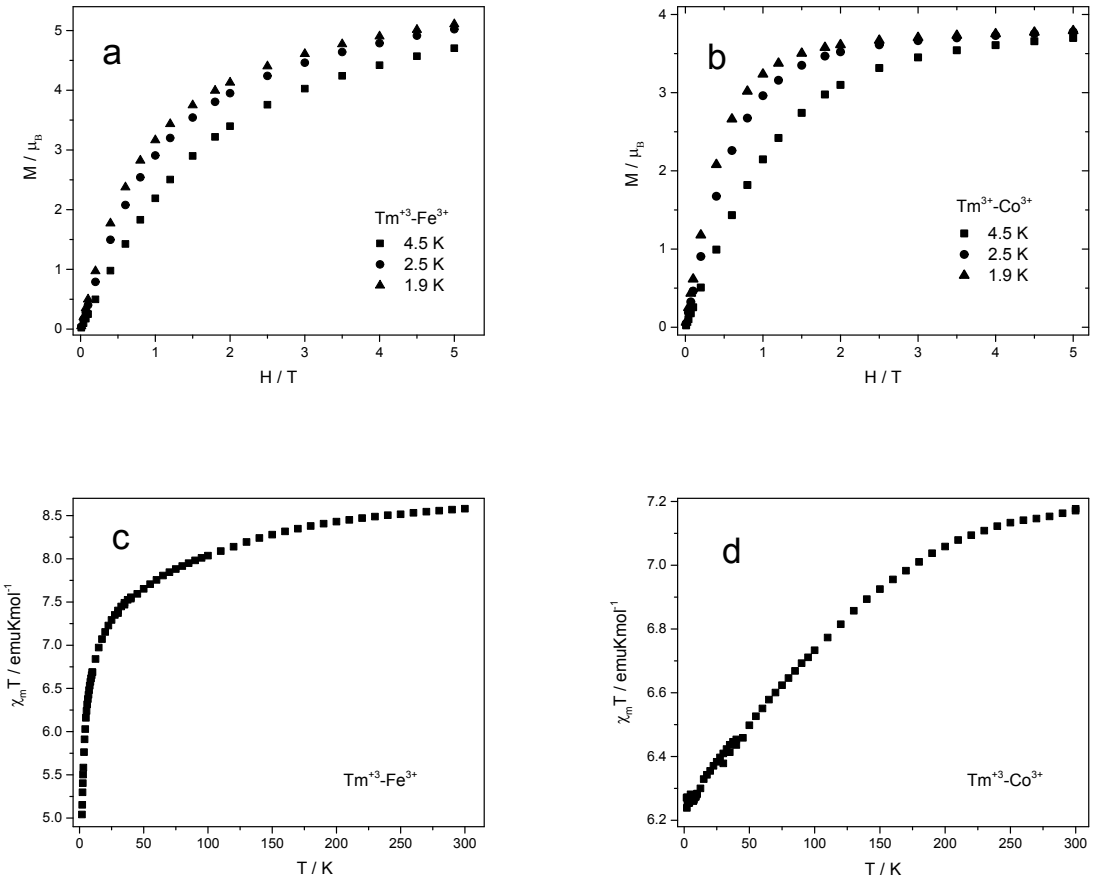

Fig. S3. M vs H (a, b) and χT vs T (c,d) plot for **Tm-M** complexes (M= Co, Fe).

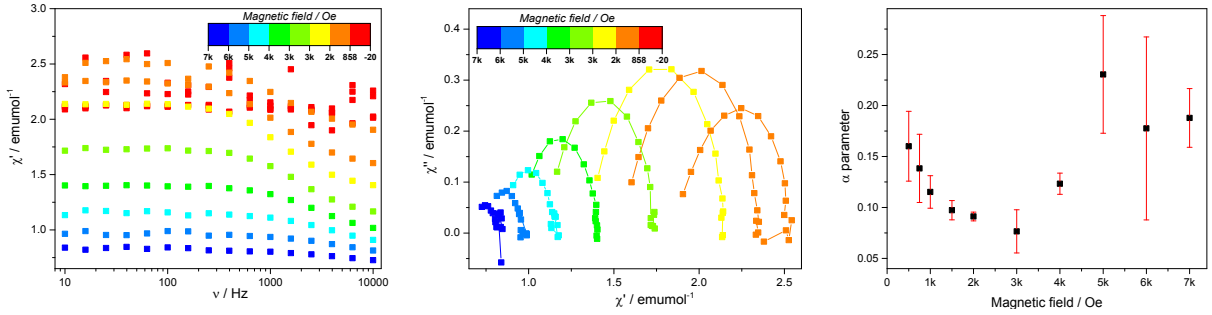

Fig. S4. Field dependence of AC magnetic susceptibility of complex **1** measured at 2 K and corresponding dependence of α parameter obtained by the fit using Debye model

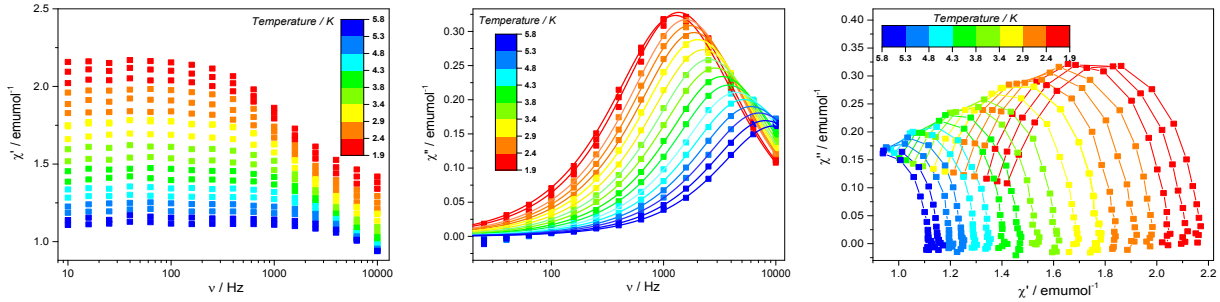

Fig. S5. Temperature dependence of AC magnetic susceptibility of complex **1** measured at 2 kOe

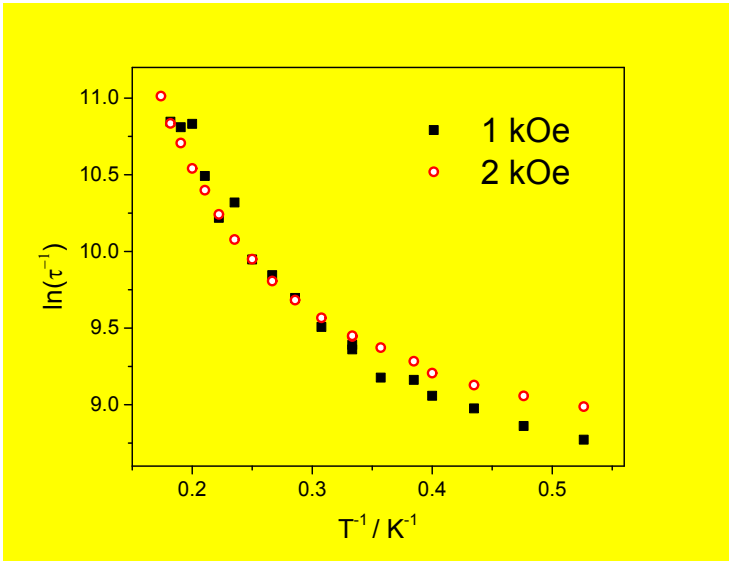

Fig. S6. Arrhenius plot of the temperature dependence of relaxation rate of complex **1** at 1 and 2 kOe.

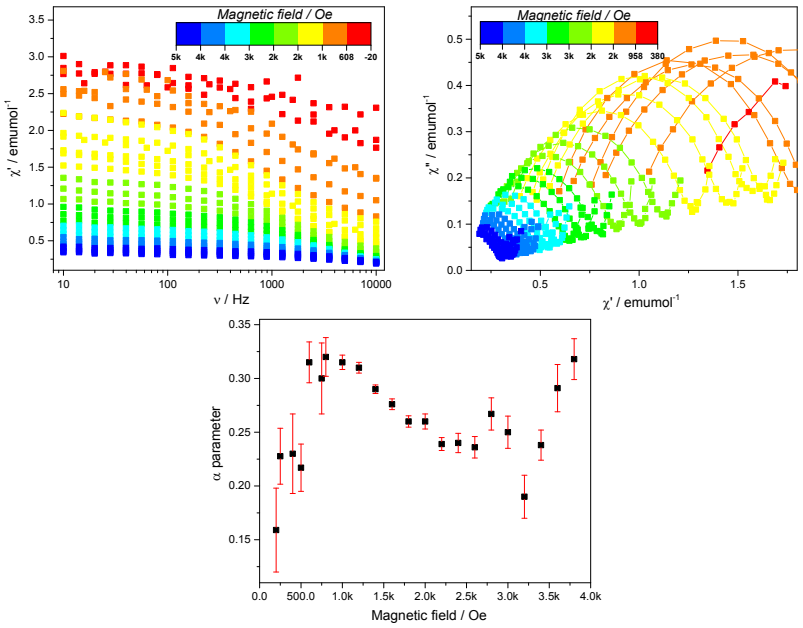

Fig. S7. Field dependence of AC magnetic susceptibility of complex **2** measured at 2 K (fresh pellet) and corresponding dependence of α parameter obtained by the fit using Debye model.

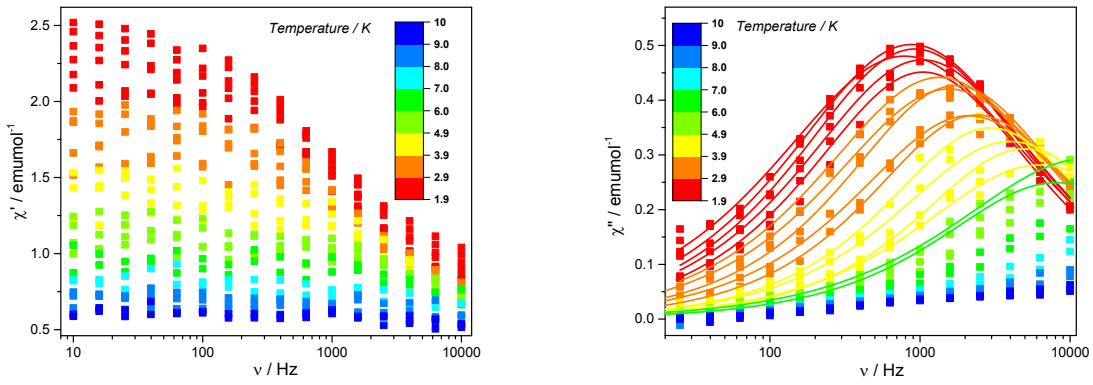

Fig. S8 Temperature dependence of AC magnetic susceptibility of complex **2** measured at 1 kOe (fresh pellet).

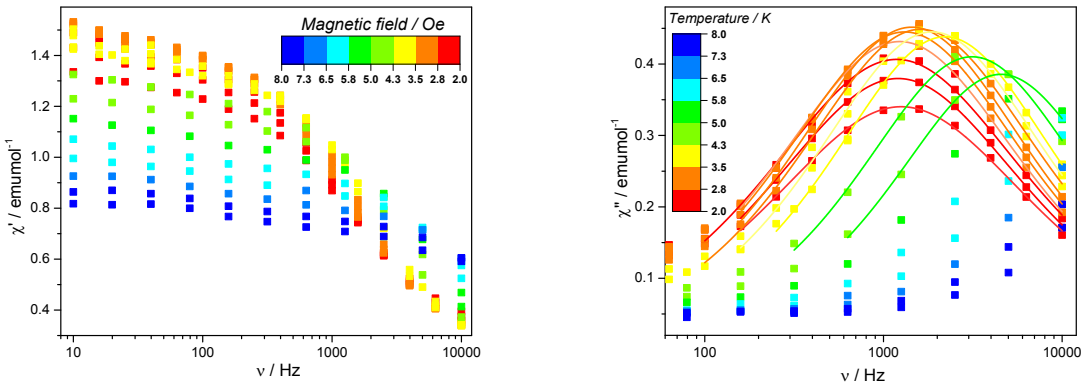

Fig. S9. Temperature dependence of AC magnetic susceptibility of complex **2** measured at 2 kOe (fresh pellet).

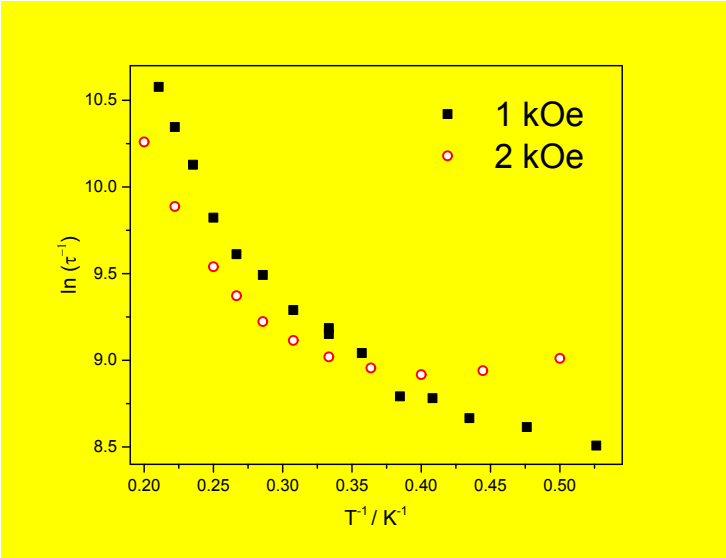

Fig. S10. Arrhenius plot of the temperature dependence of relaxation rate of complex **2** at 1 and 2 kOe.

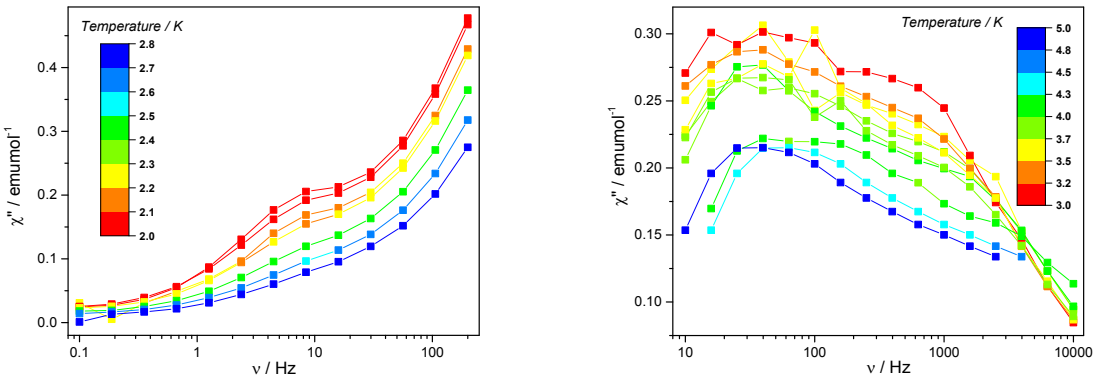

Fig. S11. AC susceptibility of complex **2** measured at 1 (left) and 2 kOe (right) on a 3 months aged pellet.

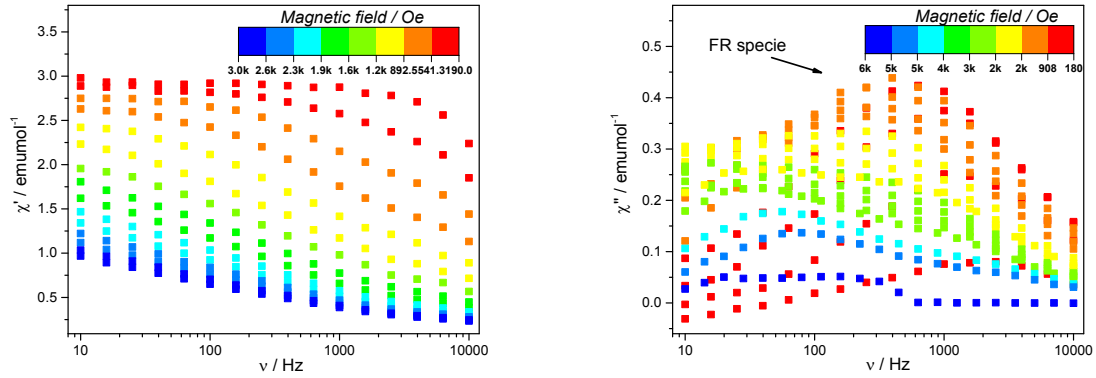

Fig. S12. AC susceptibility of complex **2** measured at 2 K as function of magnetic field on a six-month aged pallet.

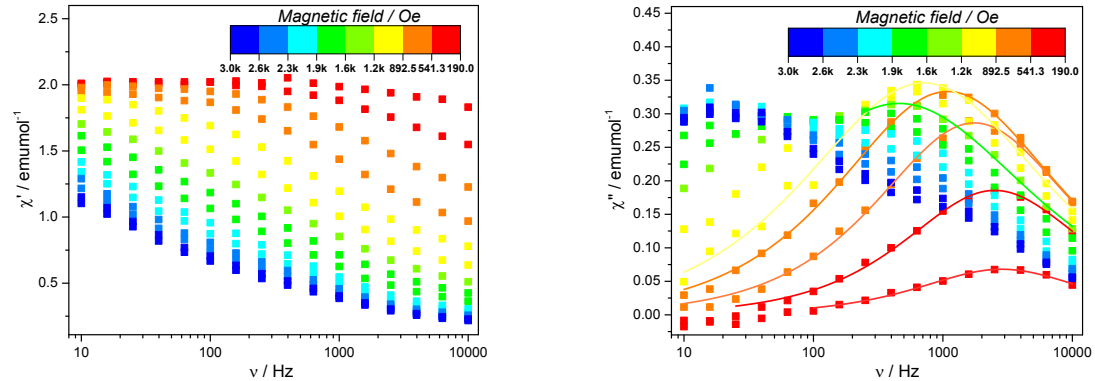

Fig. S13. AC susceptibility of complex **2** measured at 3 K as function of magnetic field on a six-month aged pallet.

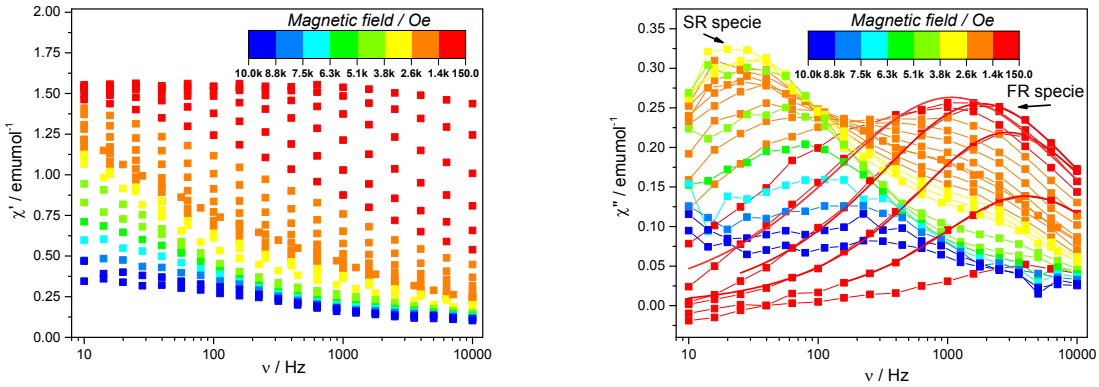

Fig. S14. AC susceptibility of complex **2** measured at 4 K as function of magnetic field on a six-month aged pallet.

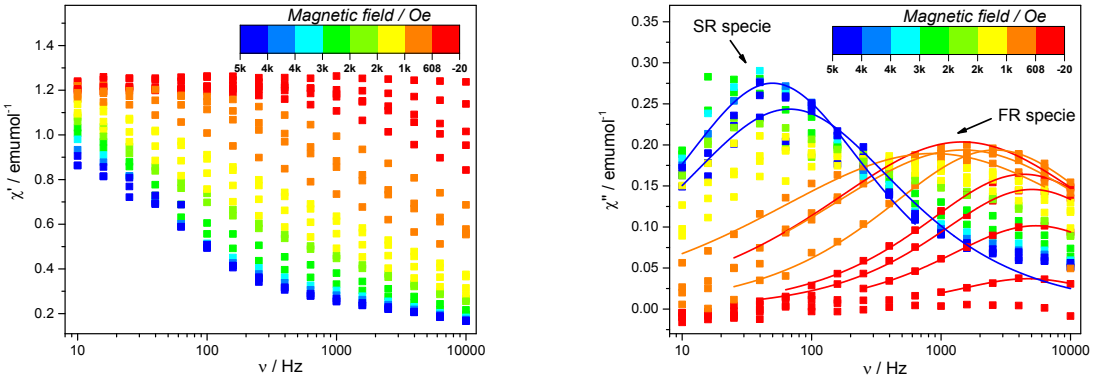

Fig. S15. AC susceptibility of complex **2** measured at 5 K as function of magnetic field on a six-month aged pallet.

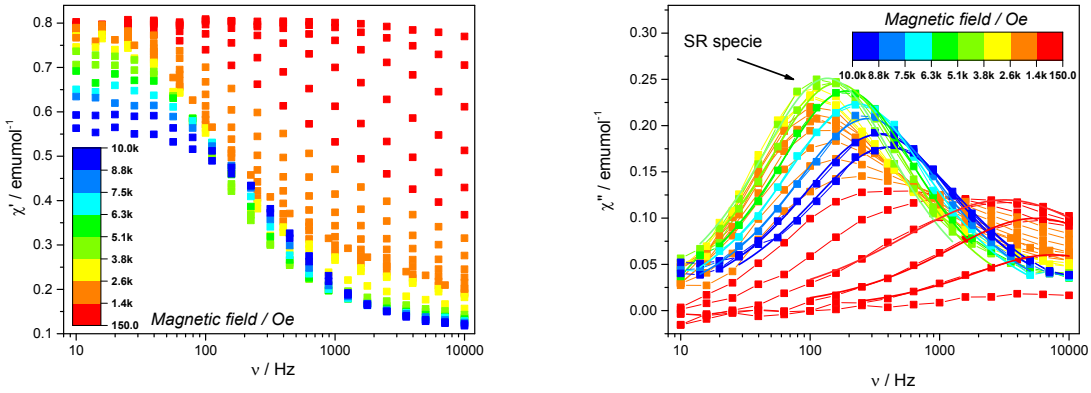

Fig. S16. AC susceptibility of complex **2** measured at 8 K as function of magnetic field on a six-month aged pallet.

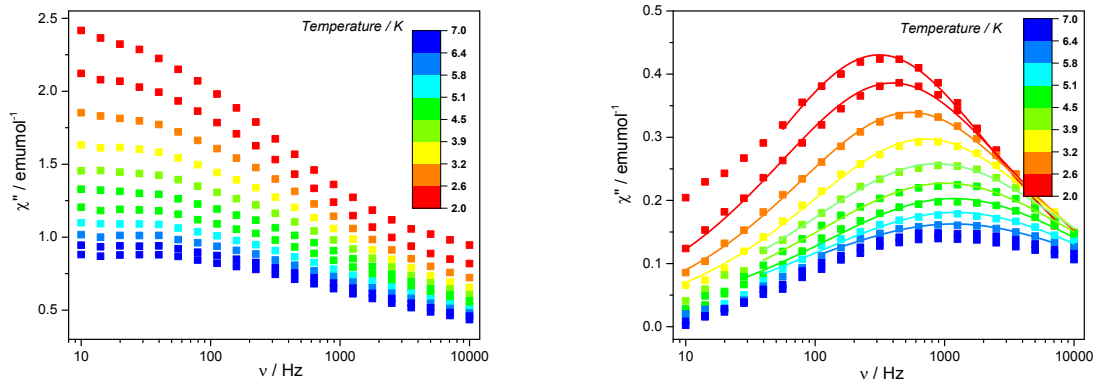

Fig. S17. AC susceptibility of complex **2** measured at 1 KOe as function of temperature on a six-month aged pallet.

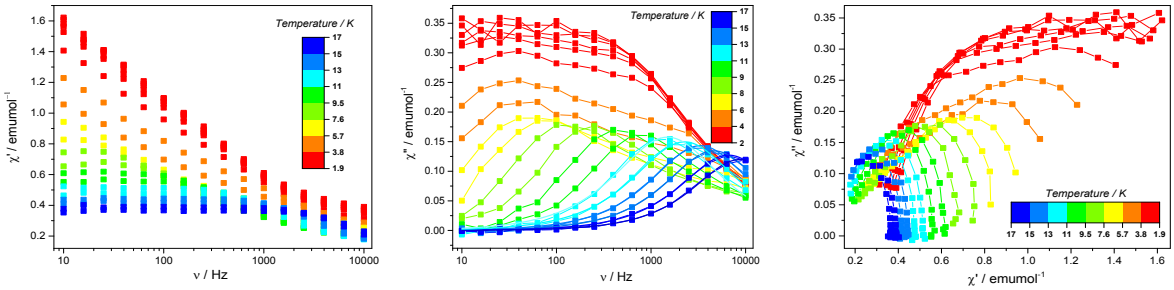

Fig. S18. AC susceptibility of complex **2** measured at 2 KOe as function of temperature on a six-month aged pallet.

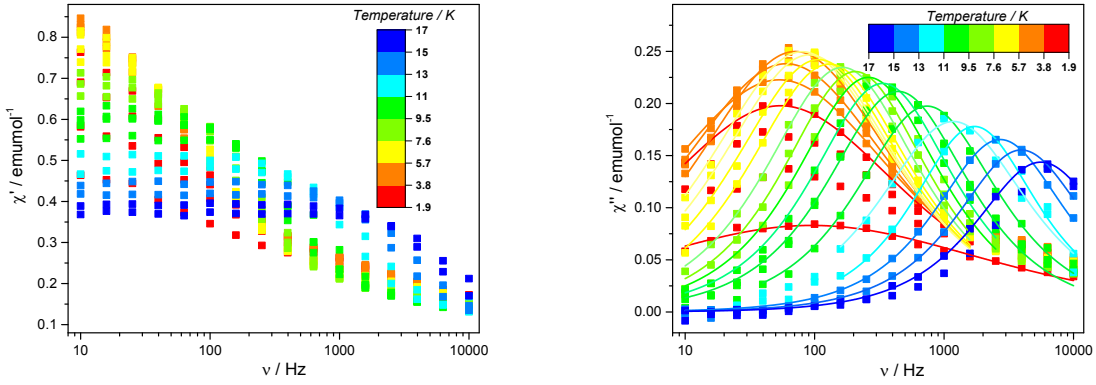

Fig. S19. AC susceptibility of complex **2** measured at 5 KOe as function of temperature on a six-month aged pallet.

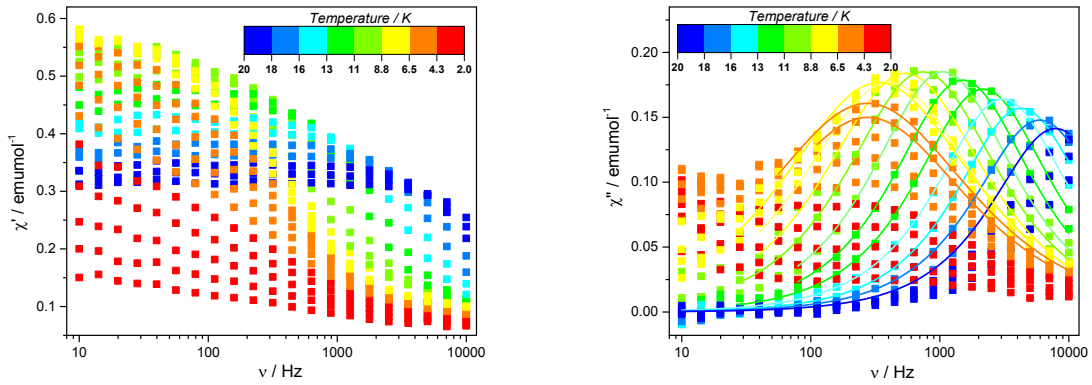

Fig. S20. AC susceptibility of complex **2** measured at 10 KOe as function of temperature on a six-month aged pallet.

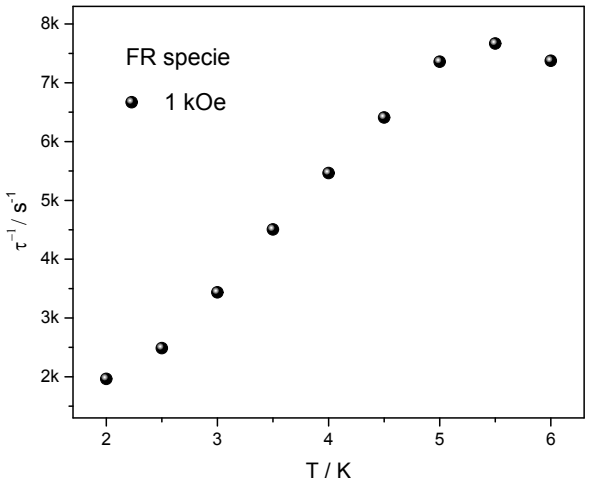

Fig. S21. Temperature dependence of relaxation rate of FR specie of complex **2** in six-month aged pellet, measured at 1 kOe.

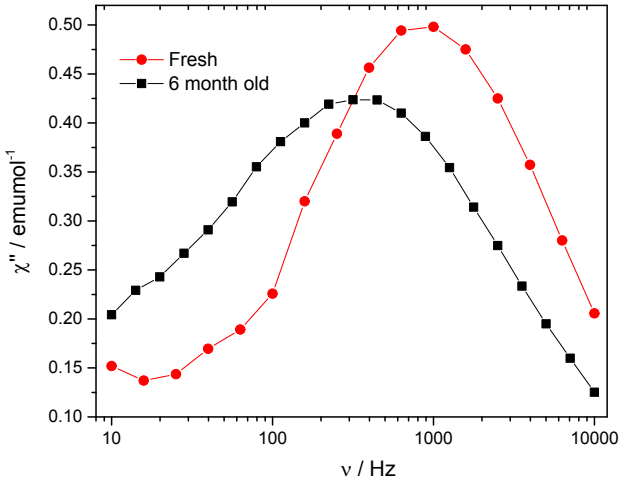

Fig. S22. Comparison of the frequency dependence of imaginary susceptibility of FR specie complex **2** measured at 1 kOe and 2 K for a fresh and 6 month aged sample.

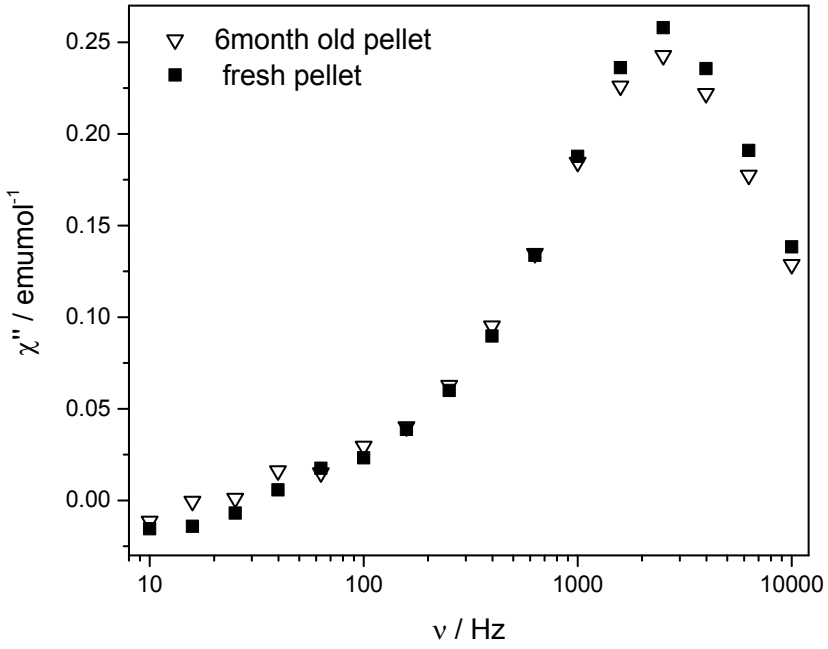

Fig. S23. Comparison of the frequency dependence of imaginary susceptibility of complex **1** measured at 2 kOe and 3.5 K for a fresh and 6 month aged sample.

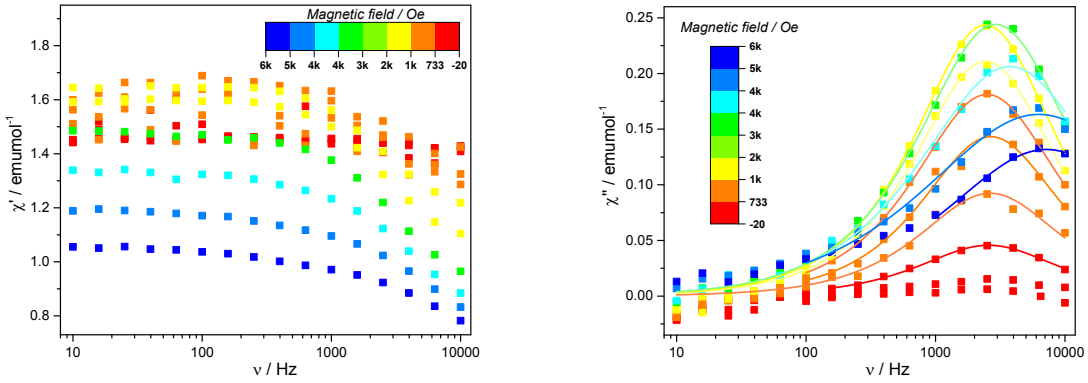

Fig. S24. Field dependence of AC susceptibility of complex **1** measured at 3.5 K on a 6-month aged pallet.

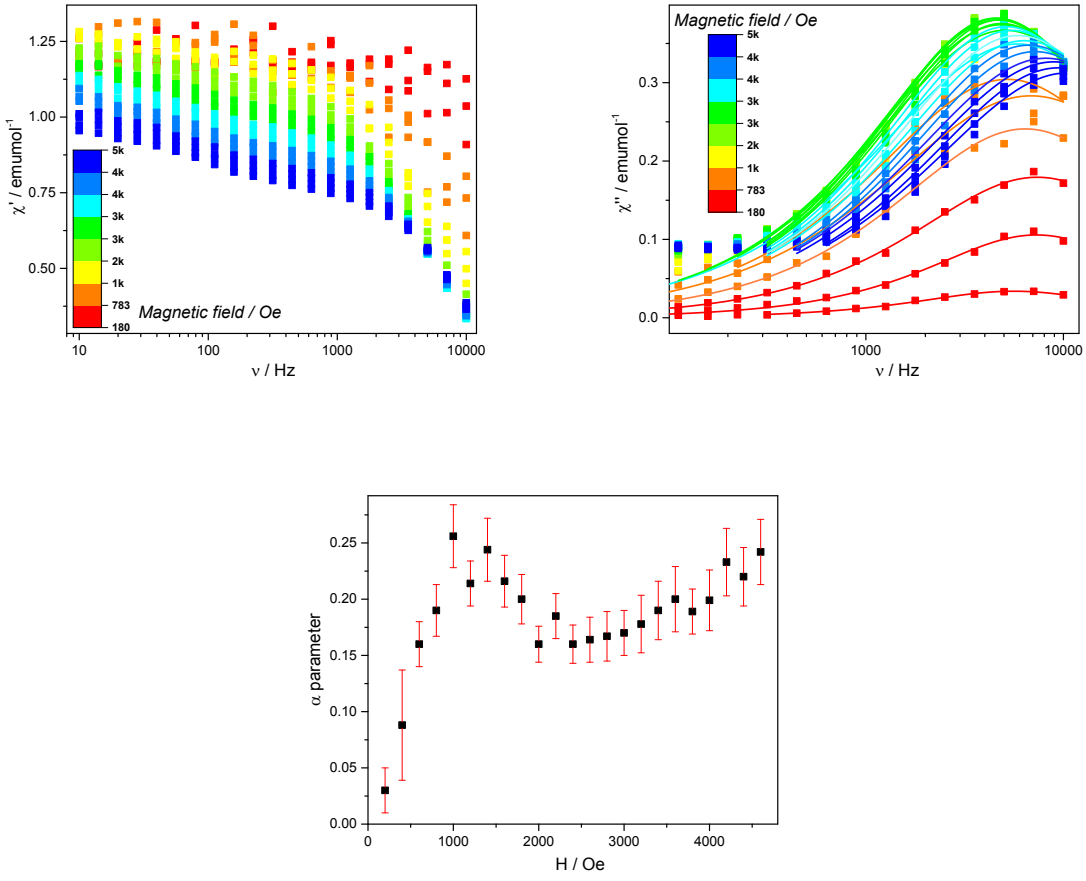

Fig. S25. Field dependence of α parameter obtained from Debye fit for a fresh pellet of complex **2** measured at 5 K.

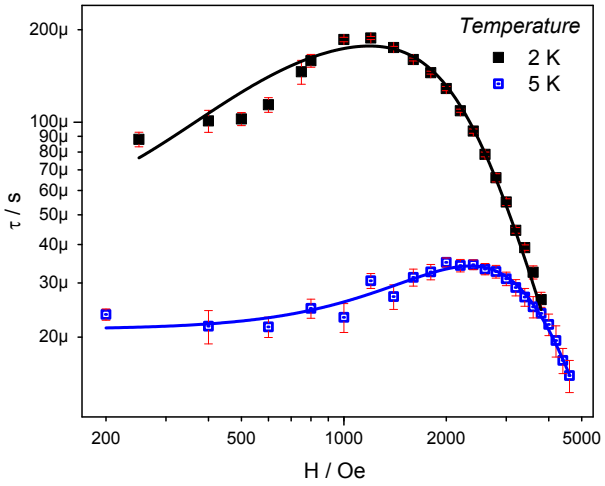

Fig. S26. Field dependence of relaxation time obtained from Debye fit for a fresh pellet of complex **2** measured at 2 K and 5 K.

Table S1. Best fit parameters for the temperature dependence of τ of the SR specie observed at different fields over 2 -17 K.

	C / $s^{-1}K^n$	**n**	**QT / s^{-1}**
2 kOe	0.025 ± 0.005	5.15 ± 0.075	230
5 kOe	0.032 ± 0.012	4.98 ± 0.13	300
10 kOe	0.0235 ± 0.0028	5.129 ± 0.04	1546 ± 78

Table S2. Relaxation rate of the FR specie observed at 2 K and I kOe of fresh and 6-month old pressed pallet of **2**.

	Fresh / μs	**Aged** / μs
2 K - Hscan		
400 Oe	101	118
1 kOe	185	440
1.4 kOe	177	688
1 kOe - T scan		
2 K	191	496
3 K	107	292
4 K	54	181
5 K	22	134

Table S3 Elemental analysis for 6-month aged sample of **1**

	C	H	N
experimental	20.32	2.76	18.71
Theor. for $TmCo(dmf)_4(CN)_6(H_2O)_3 \cdot 1.25H_2O$	26.50	4.37	18.54
Theor. for $TmCo(dmf)(CN)_6(H_2O)_3 \cdot 0.75H_2O$	20.60	2.79	18.69