Electronic Supplementary Information

Heterodinuclear M^{II}-Ln^{III} single molecule magnets constructed from exchange-coupled single ion magnets

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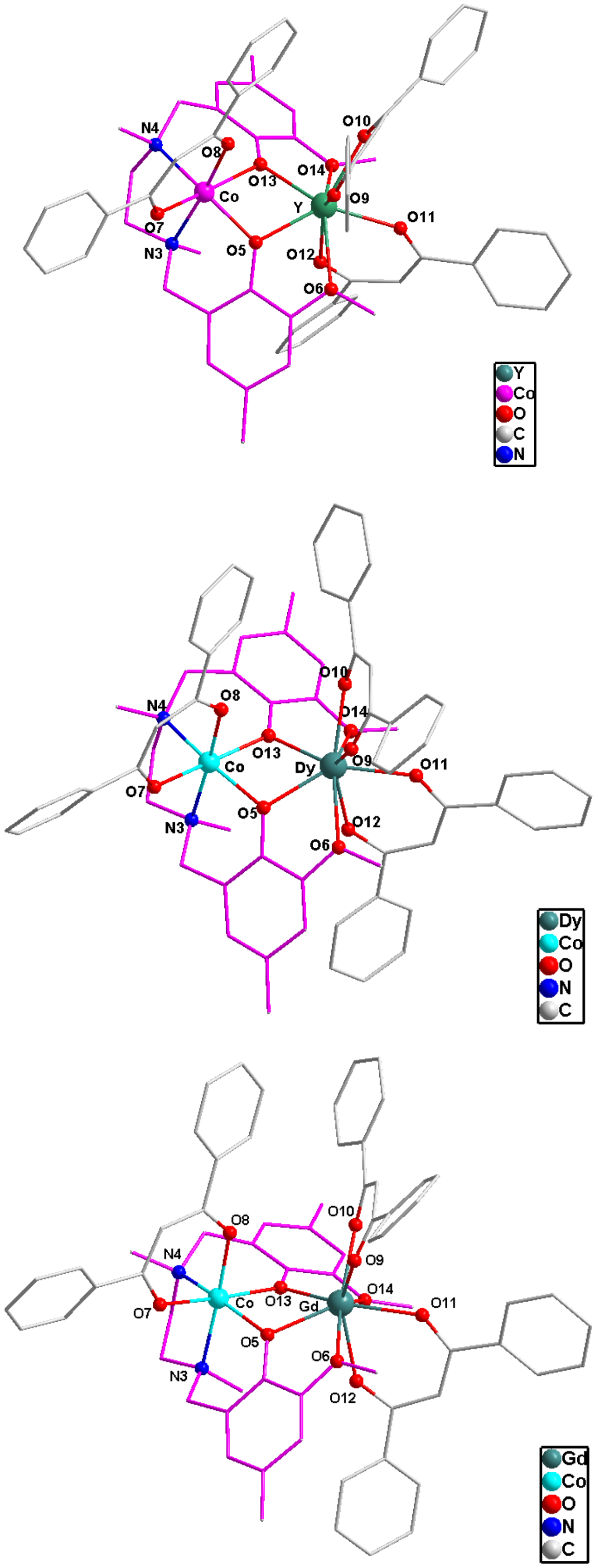


Fig. S1. Crystal structure of complexes 2-4.

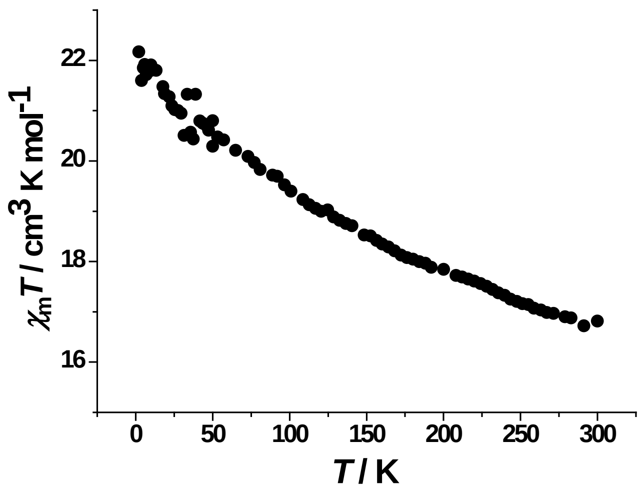


Fig. S2. Temperature dependence of χ_mT per $Zn^{II}Dy^{III}$ unit for a diluted sample Z $ZnDy_{0.0885}Y_{0.9115}$ (Dy:Y = 1:10.3 determined by ICP analysis) of complex **1**.

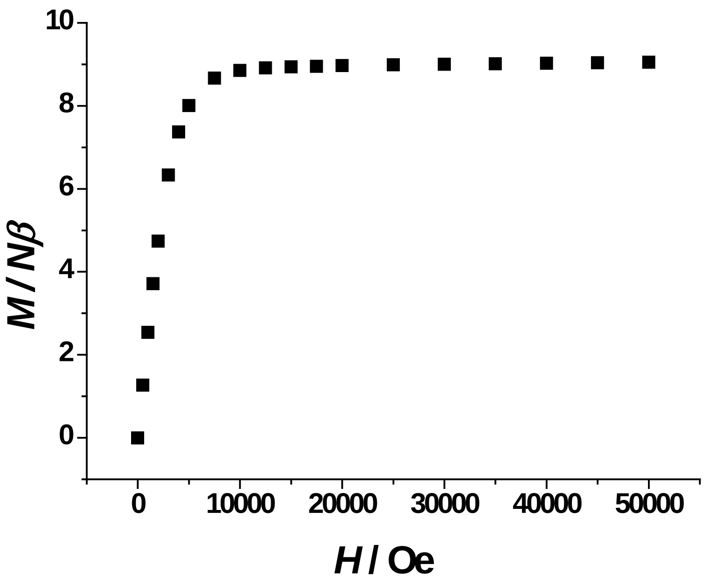


Fig. S3. Field dependence of magnetization for complex **1** at 2.0 K.

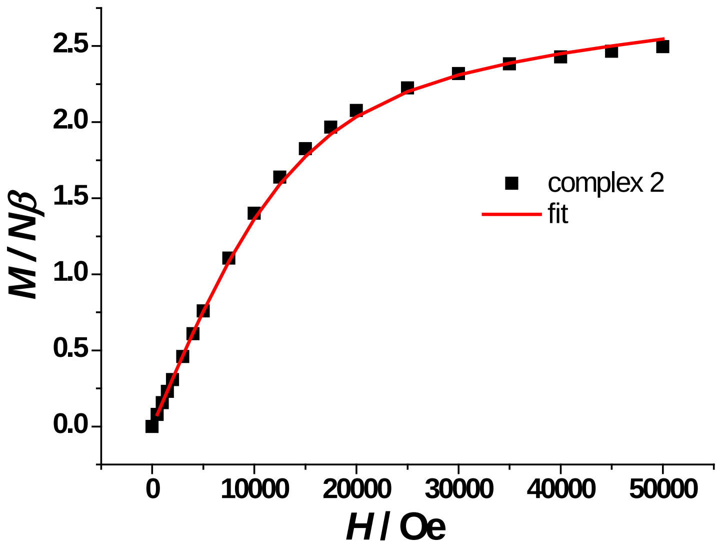


Fig. S4. Field dependence of magnetization for complex **2** at 2.0 K. The red line is the best fitting result with g = 2.39, D = 10.3 cm^{-1} and E = 4×10^{-4} cm^{-1}.

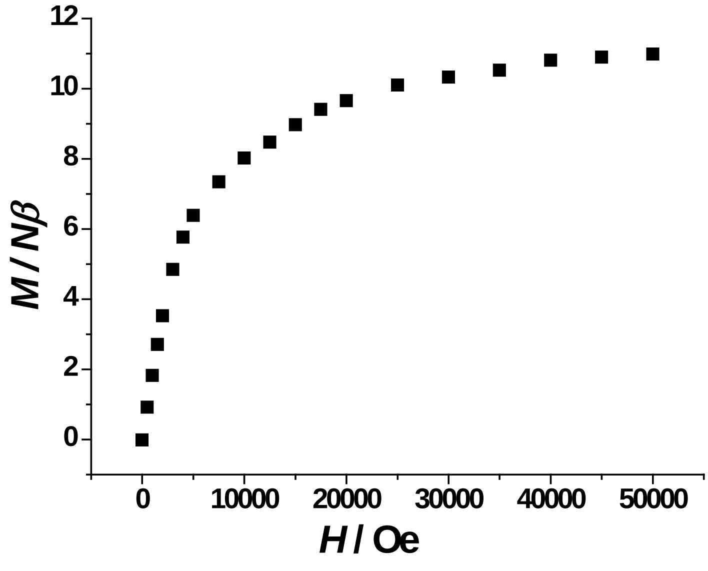


Fig. S5. Field dependence of magnetization for complex **3** at 2.0 K.

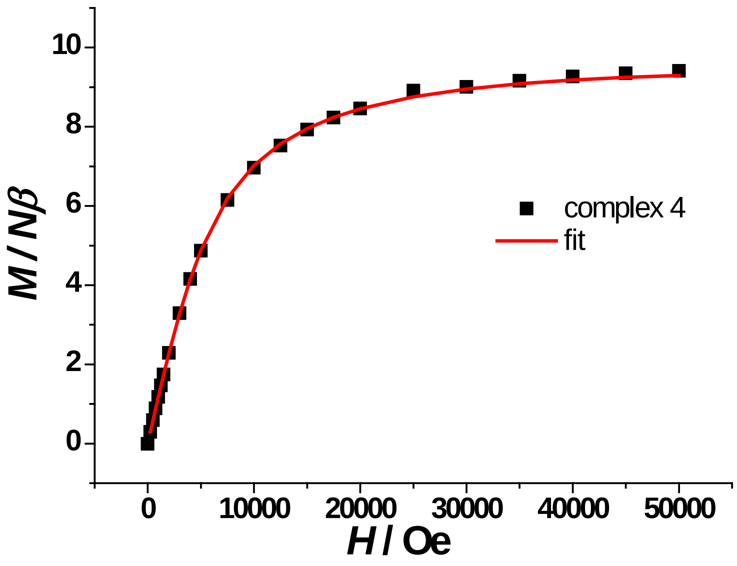


Fig. S6. Field dependence of magnetization for complex **4** at 2.0 K. The red line is the best fitting result with g = 1.89 and D = 0.17 cm^{-1}.

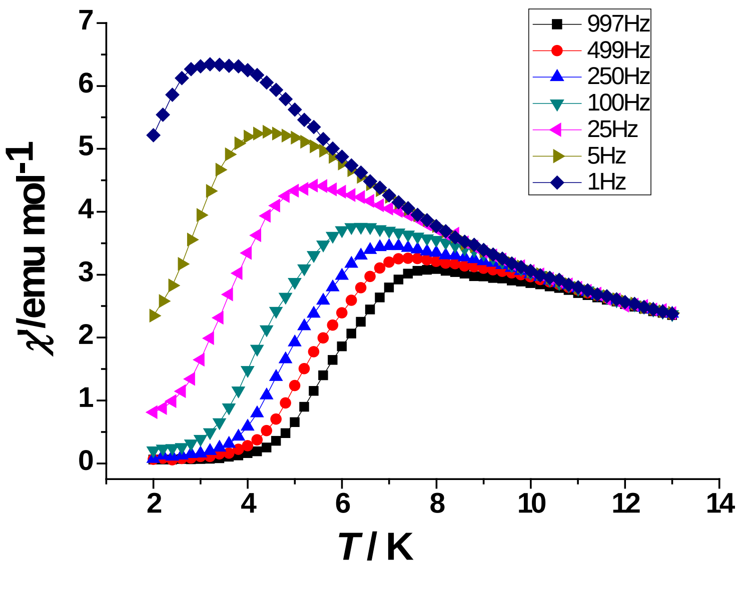


Fig. S7. Temperature dependence of in-phase magnetic susceptibility of complex **1** under 2 kOe dc field.

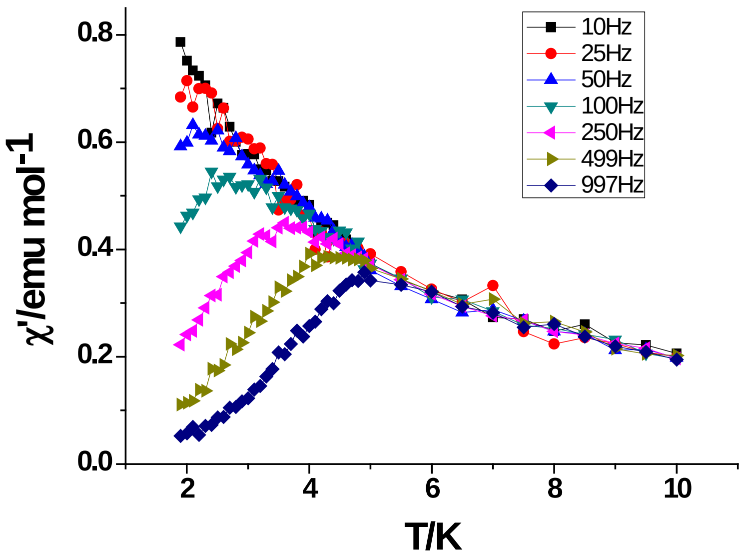


Fig. S8. Temperature dependence of in-phase magnetic susceptibility of complex **2** under 2 kOe dc field.

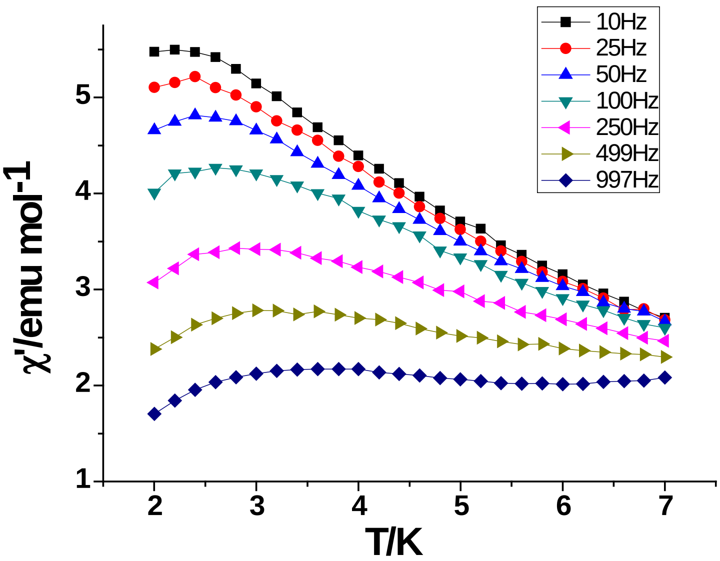
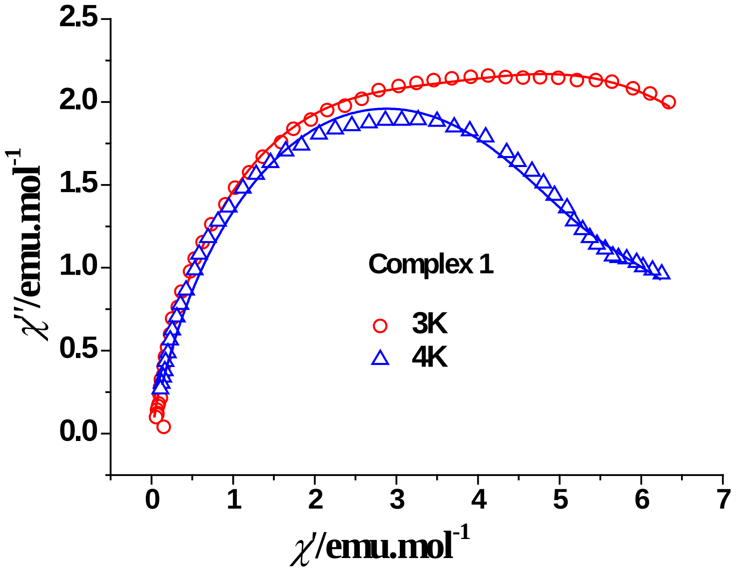


Fig. S9. Temperature dependence of in-phase magnetic susceptibility of complex **3** under 2 kOe dc field.



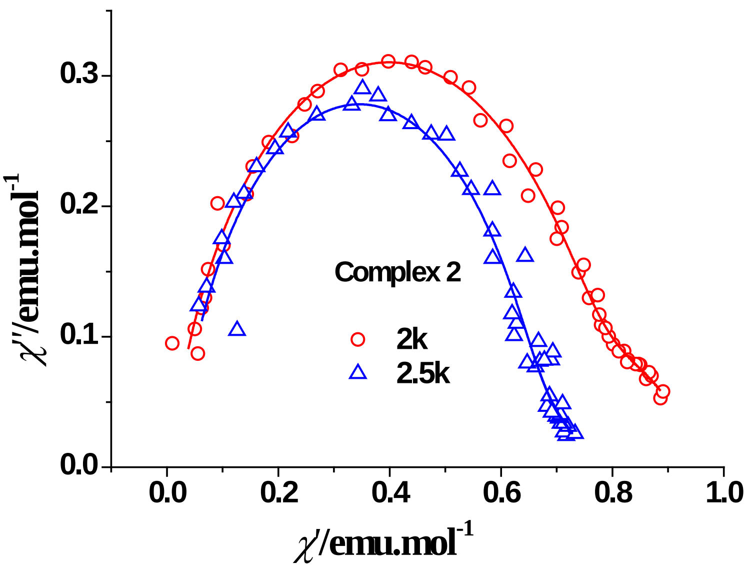


Fig. S10. Cole-Cole plots in 2 kOe applied dc filed for complexes **1** (top) and **2** (bottom). The solid lines represent the best fit by using the parameters in Tables S1 and S2, respectively.

Table S1. Relaxation Fitting Parameters from Least-Squares Fitting of $\chi(\omega)$ data for Complex **1**

T (K)	χ_s	χ_t	β	α_1	τ_1	α_2	τ_2
3	8.05E-17	8.82	0.30	0.11	0.048	0.31	0.64
4	6.92E-18	7.53	0.33	0.36	0.91	0.22	0.024

Table S2. Relaxation Fitting Parameters from Least-Squares Fitting of $\chi(\omega)$ data for Complex **2**

T (K)	χ_s	χ_t	β	α_1	τ_1	α_2	τ_2
2	0.0049	0.95	0.79	0.14	0.0072	0.38	0.40
2.5	2.32E-16	0.77	0.71	0.059	0.0041	0.62	0.034

The corresponding expression of molar magnetic susceptibility for complex **4** is given in Eq. (S1).

$$\hat{H} = -2J_{\mathrm{CoGd}}\hat{S}_{\mathrm{Gd}}\hat{S}_{\mathrm{Co}}$$

$$\chi_{\mathrm{m}} = \frac{N\beta^2}{3k(T-\theta)} \cdot \frac{330g_{(5)}^2\exp(24x) + 180g_{(4)}^2\exp(14x) + 84g_{(3)}^2\exp(6x) + 30g_{(2)}^2}{11\exp(24x) + 9\exp(14x) + 7\exp(6x) + 5} \quad \text{(S1)}$$

$$x = J_{\mathrm{CoGd}}/kT,$$

$$g_{(5)} = \frac{7}{10}g_{\mathrm{Gd}} + \frac{3}{10}g_{\mathrm{Co}},$$

$$g_{(4)} = \frac{8}{10}g_{\mathrm{Gd}} + \frac{2}{10}g_{\mathrm{Co}},$$

$$g_{(3)} = g_{\mathrm{Gd}},$$

$$g_{(2)} = \frac{3}{2}g_{\mathrm{Gd}} - \frac{1}{2}g_{\mathrm{Co}}$$