# Supplementary Materials: Metal-Organic Framework of Lanthanoid Dinuclear Clusters Undergoes Slow Magnetic Relaxation

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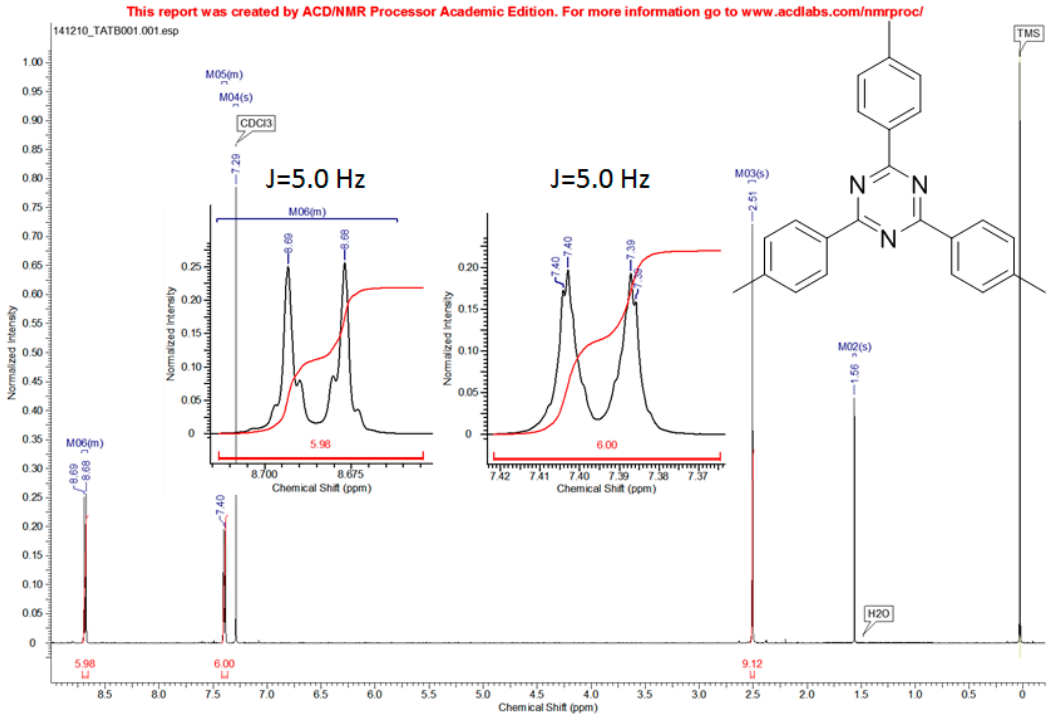



**Figure S1.** $^{1}$H NMR spectrum of 2,4,6-tri-*p*-tolyl-1,3,5-triazine in $CDCl_3$ at 500 MHz on a Bruker AV-500 spectrometer.

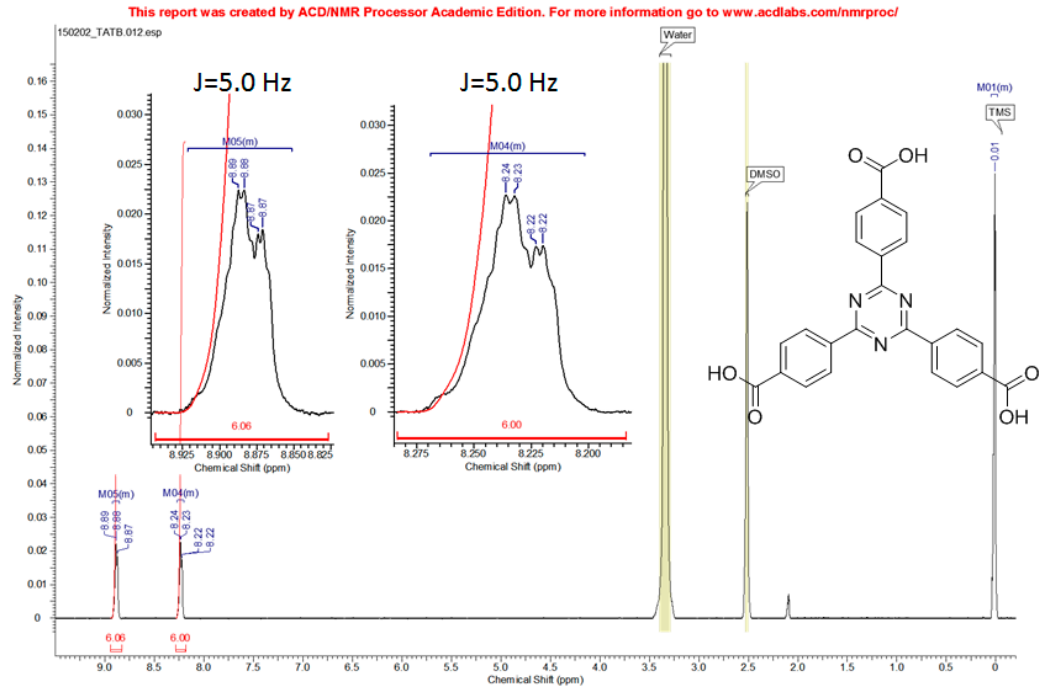



**Figure S2.** $^{1}$H NMR spectrum of 4,4′,4″-s-triazine-2,4,6-triyl-tribenzoic acid ($H_3$TATB) in $CDCl_3$ at 500 MHz on a Bruker AV-500 spectrometer.

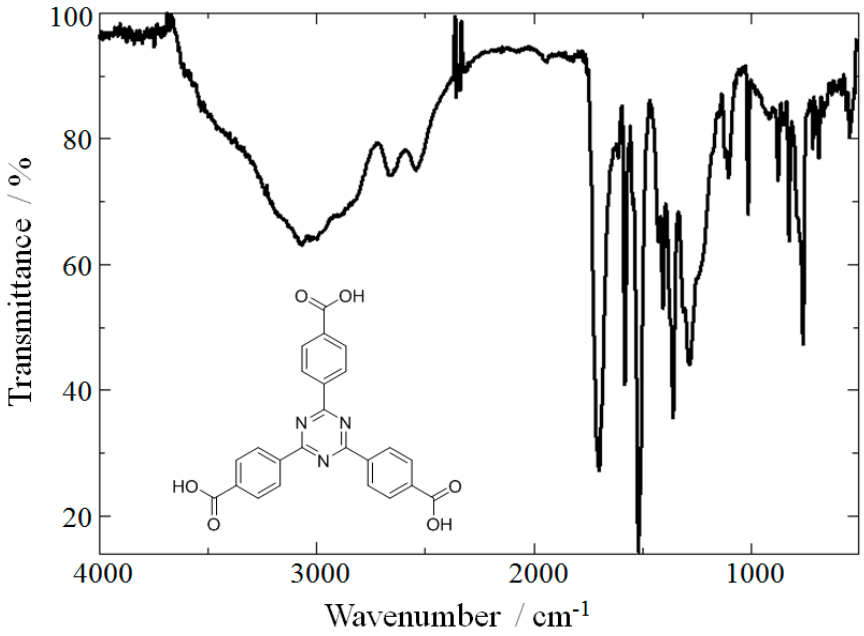
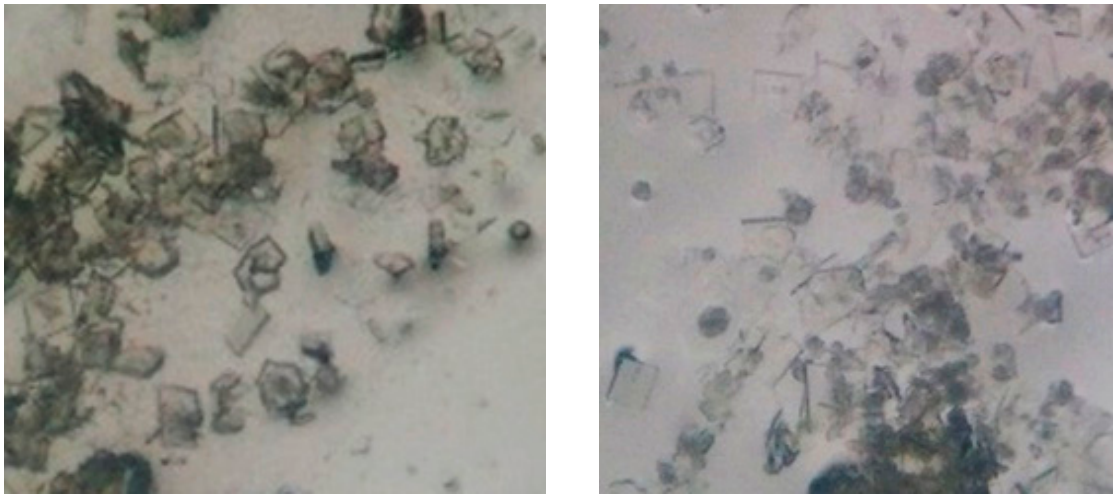



**Figure S3.** IR spectrum of $H_3$TATB.



(**a**) (**b**)

**Figure S4.** Obtained transparent crystals of (**a**) **1** and (**b**) **2**.

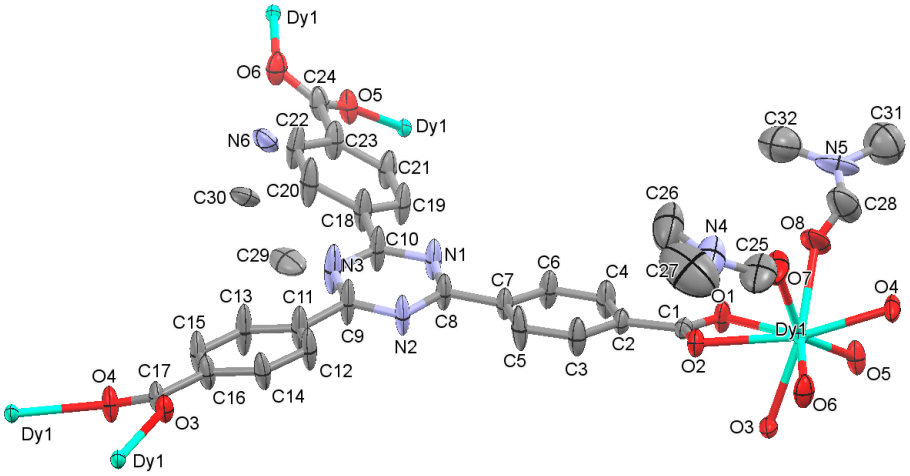



**Figure S5.** ORTEP drawing of asymmetric unit of **1** with thermal ellipsoid of 50% probability**.** Hydrogen atoms are omitted for clarity.

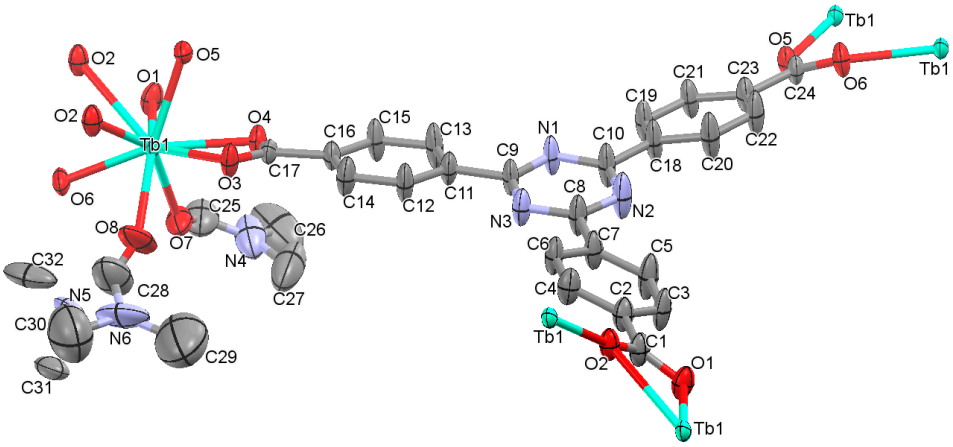
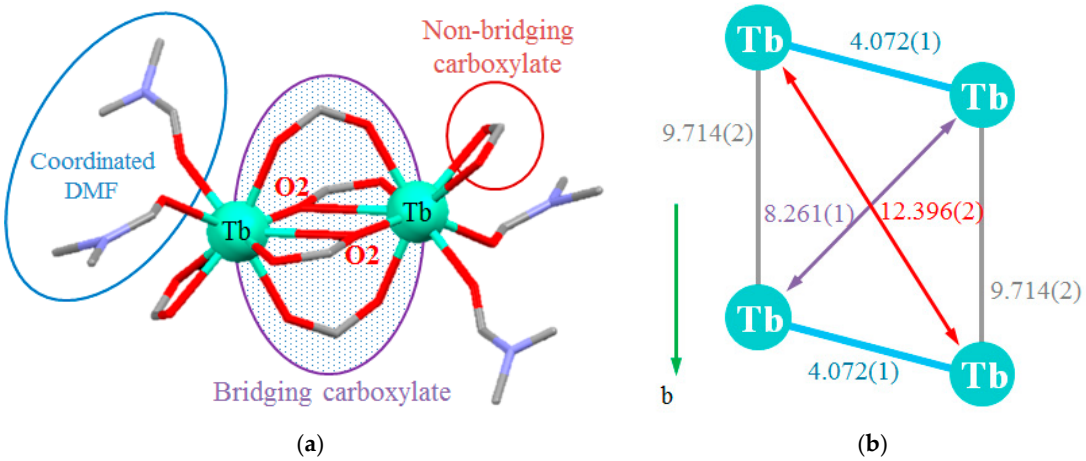



**Figure S6.** ORTEP drawing of asymmetric unit of **2** with thermal ellipsoid of 50% probability. Hydrogen atoms are omitted for clarity.




(**a**) (**b**)

**Figure S7.** Drawings of (**a**) Tb(III) dinuclear clusters in **2**; and (**b**) their Tb-Tb distances. The unit of length is Å.

**Table S1.** Crystal structure parameters for **1** and **2**.

| Compounds | 1 [Dy(TATB)(DMF)$_2$] | 2 [Tb(TATB)(DMF)$_2$] |
|---|---|---|
| Formula | $C_{30}H_{26}N_5O_8Dy$ | $C_{30}H_{26}N_5O_8Tb$ |
| Formula mass/g·mol$^{-1}$ | 747.06 | 743.48 |
| *T*/K | 110 | 110 |
| Crystal system | monoclinic | monoclinic |
| Space group | *C*2/*c* | *C*2/*c* |
| *a*/Å | 33.138(10) | 33.137(7) |
| *b*/Å | 9.893(3) | 9.7145(17) |
| *c*/Å | 26.959(8) | 27.314(6) |
| α/° | 90 | 90 |
| β/° | 106.751(5) | 107.642(3) |
| γ/° | 90 | 90 |
| *V*/Å$^3$ | 8463(4) | 8379(3) |
| *Z* | 8 | 8 |
| $R_1$ [$I > 2s(I)$] [a] | 0.0476 | 0.0461 |
| ω$R_2$ (all) [b] | 0.1328 | 0.1237 |
| GoF on $F^2$ | 1.011 | 1.098 |
| CCDC number | 151,5211 | 1,516,111 |

[a] $R_1 = \sum(F_0 - F_c)/\sum F_0$; $wR_2 = \sqrt{\sum[w(F_0^2 - F_c^2)]/\sum[w(F_0^2)^2]}$ .

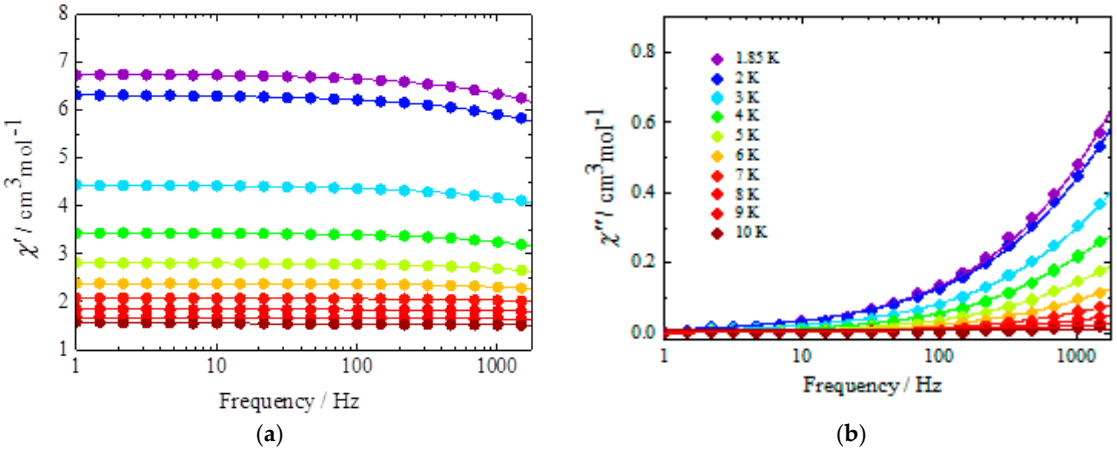



**Figure S8.** Frequency dependences of the (**a**) χ′ and (**b**) χ″ AC magnetic susceptibilities of **1** in an $H_{DC}$ of 0 Oe. The measurements were performed in an $H_{AC}$ of 3 Oe and $T$ range of 10–1.85 K.

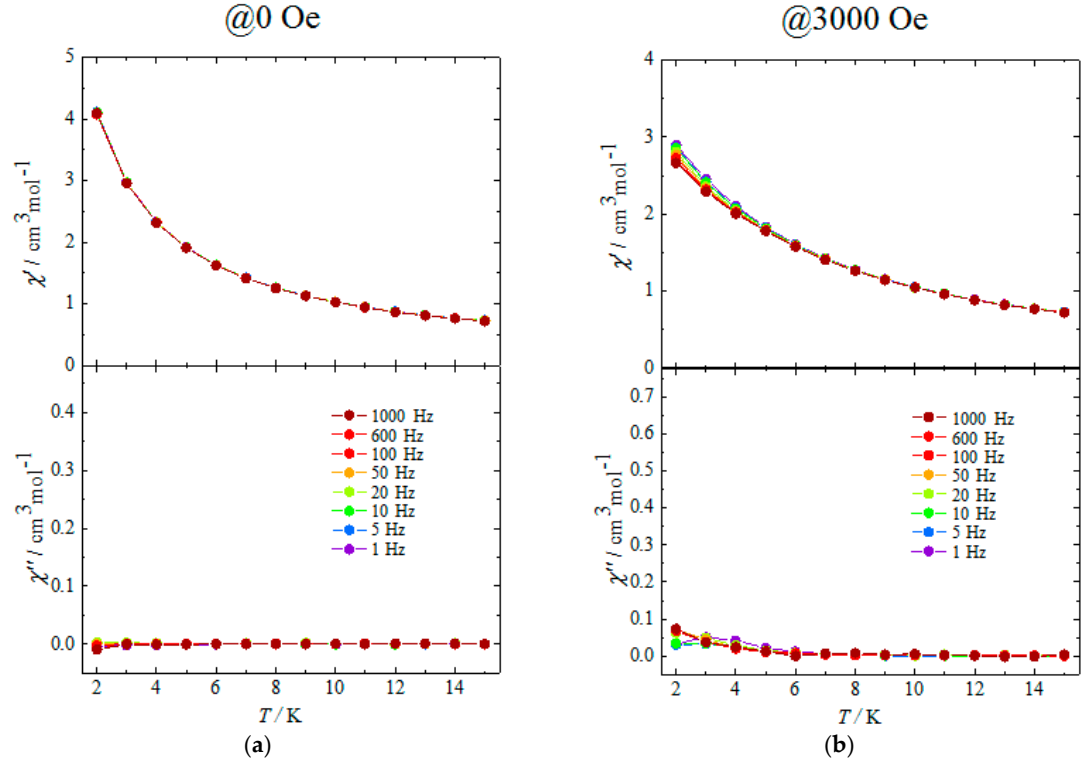



**Figure S9.** Temperature dependences of the χ′ and χ″ AC magnetic susceptibilities of **2** in $H_{DC}$ of (**a**) 0 and (**b**) 3000 Oe. The measurements were performed in an $H_{AC}$ of 3 Oe and $T$ range of 10–1.85 K.

## The Generalized Debye Model (Equations (S1) and (S2))

$$\chi'(\omega) = \chi_S + (\chi_T - \chi_S)\frac{1 + (\omega\tau)^{1-\alpha}\sin(\pi\alpha/2)}{1 + 2(\omega\tau)^{1-\alpha}\sin(\pi\alpha/2) + (\omega\tau)^{2-2\alpha}} \quad \text{(S1)}$$

$$\chi''(\omega) = (\chi_T - \chi_S)\frac{(\omega\tau)^{1-\alpha}\cos(\pi\alpha/2)}{1 + 2(\omega\tau)^{1-\alpha}\sin(\pi\alpha/2) + (\omega\tau)^{2-2\alpha}} \quad \text{(S2)}$$

where $\chi_S$ is the adiabatic susceptibility, $\chi_T$ is the isothermal susceptibility, $\omega = 2\pi\upsilon$, ($\upsilon$ is the frequency) is the angular frequency, $\tau$ is the magnetization relaxation time, and $\alpha$ is the quantitative parameter for the width of the $\tau$ distribution.

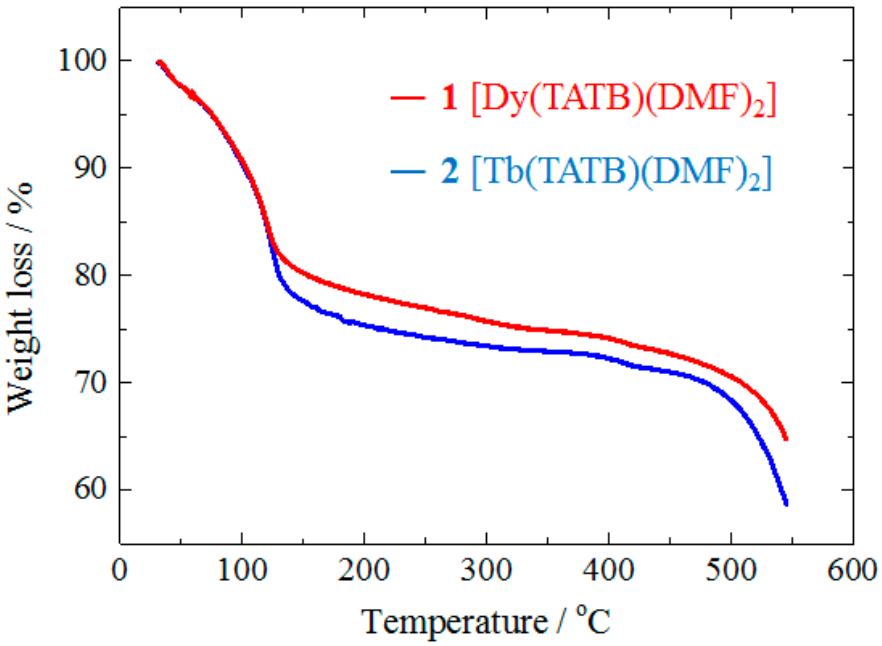



**Figure S10.** Thermogravimetric analyses of **1** and **2**.

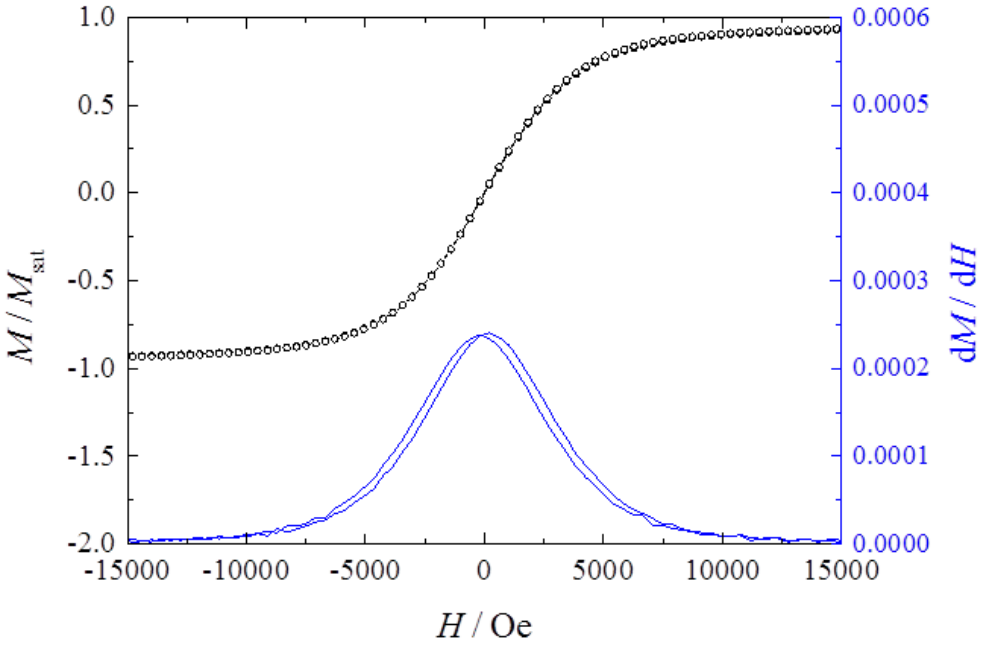



**Figure S11.** Field dependence of the magnetization of **1** at 1.8 K. Slight hysteresis was observed.