Supporting Information for

Slow magnetic relaxation in lanthanide ladder type coordination polymers

by

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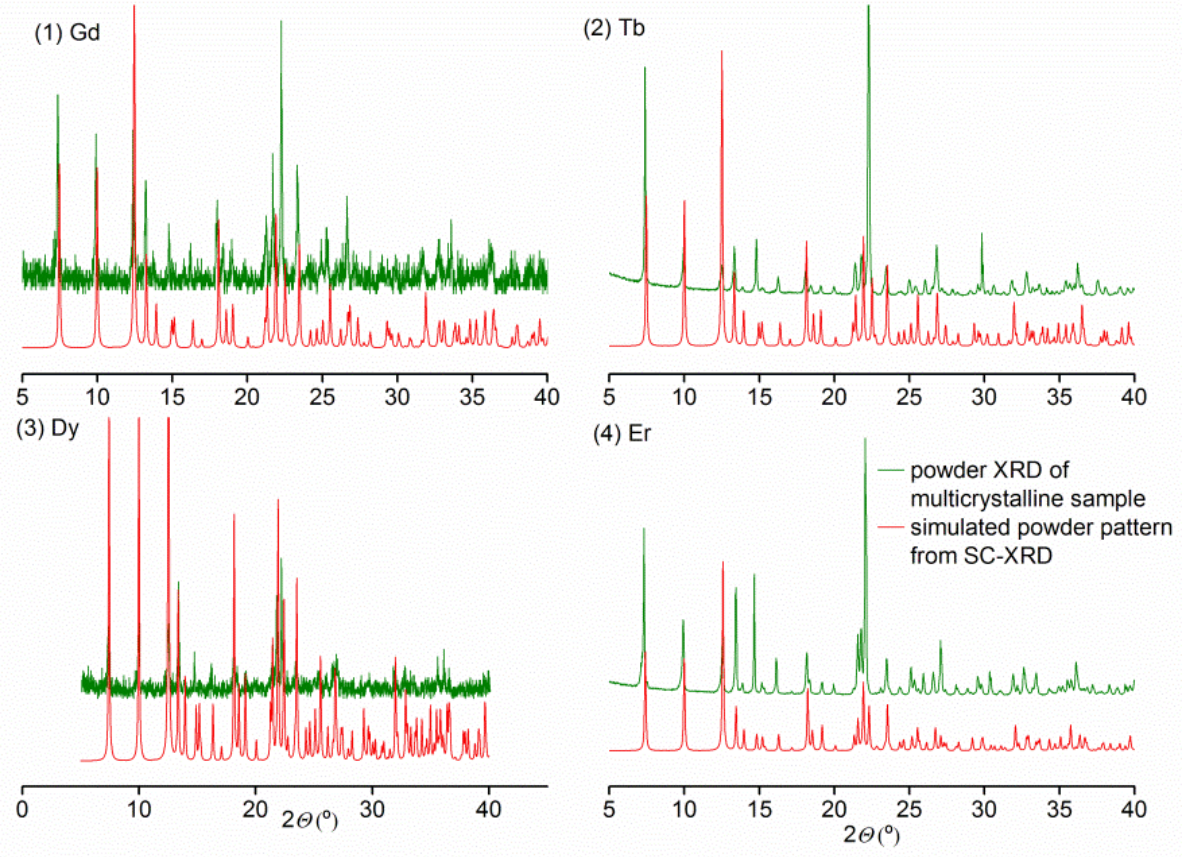

Fig. S1 Powder X-ray diffraction patterns for compounds **1**, **2**, **3** and **4**. Comparison between simulated powder patterns from the SC-XRD structure and powder XRD data.

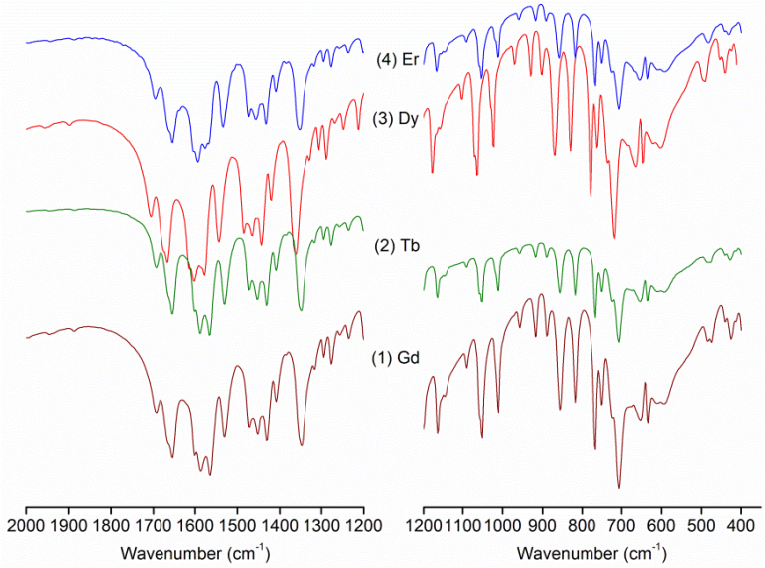

Fig. S2. FT-IR spectra for compounds **1**, **2**, **3** and **4**.

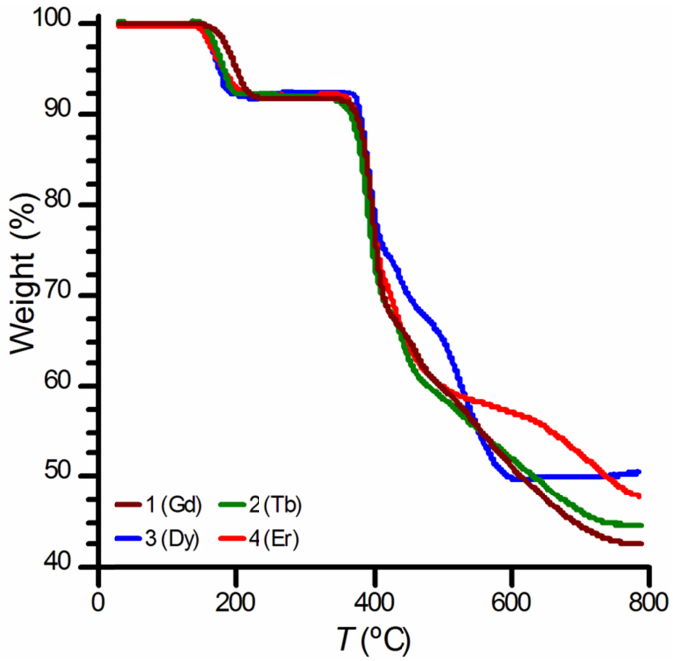

Fig. S3 TGA thermogram of complexes **1**, **2**, **3** and **4**.

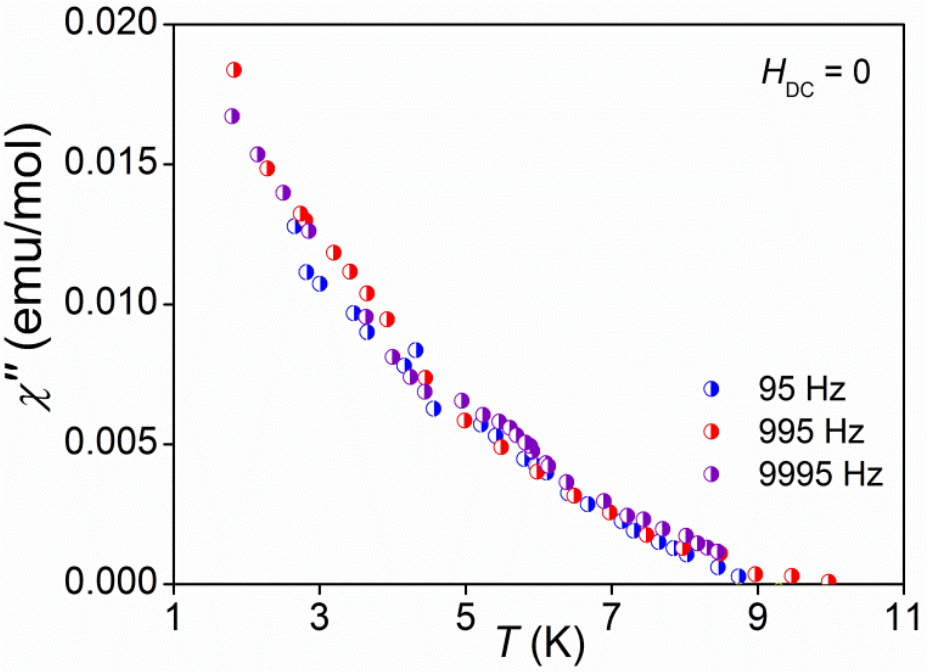

Fig. S4 Temperature dependence of the out-of-phase component of the AC magnetic susceptibility, χ'', of **1** without an applied static field, at different frequencies.

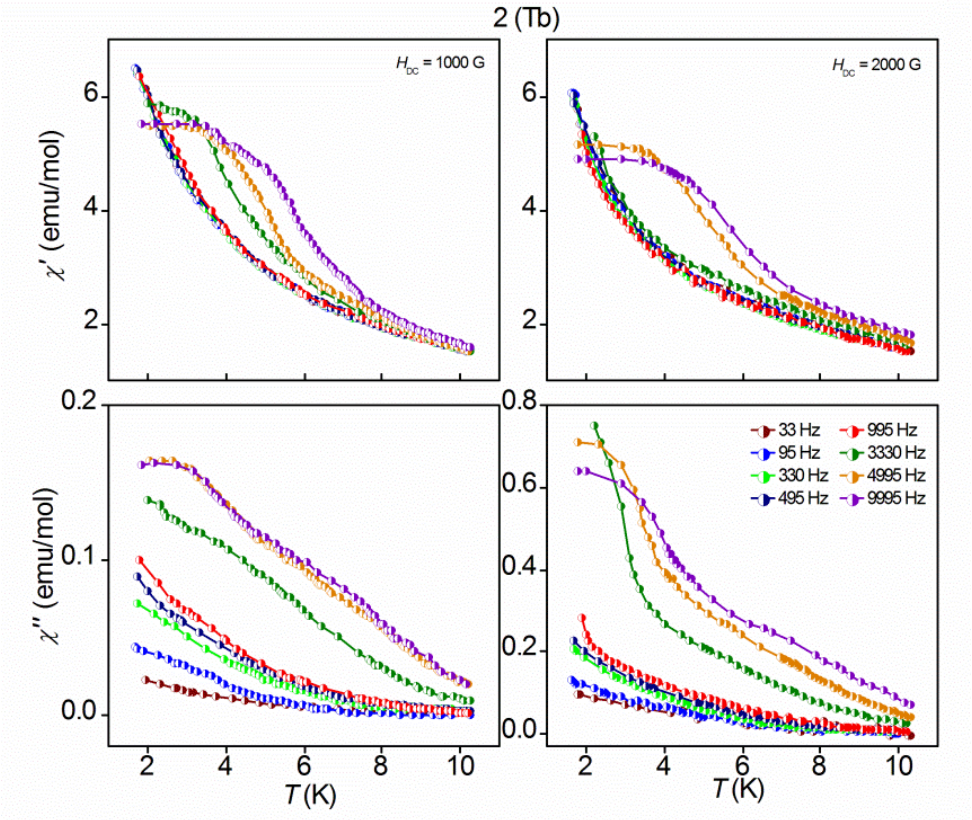

Fig. S5 Temperature dependence of the in-phase, χ', and out-of-phase, χ'', components of the AC magnetic susceptibility of **2** under applied static fields of 1 and 2 kG at different frequencies.

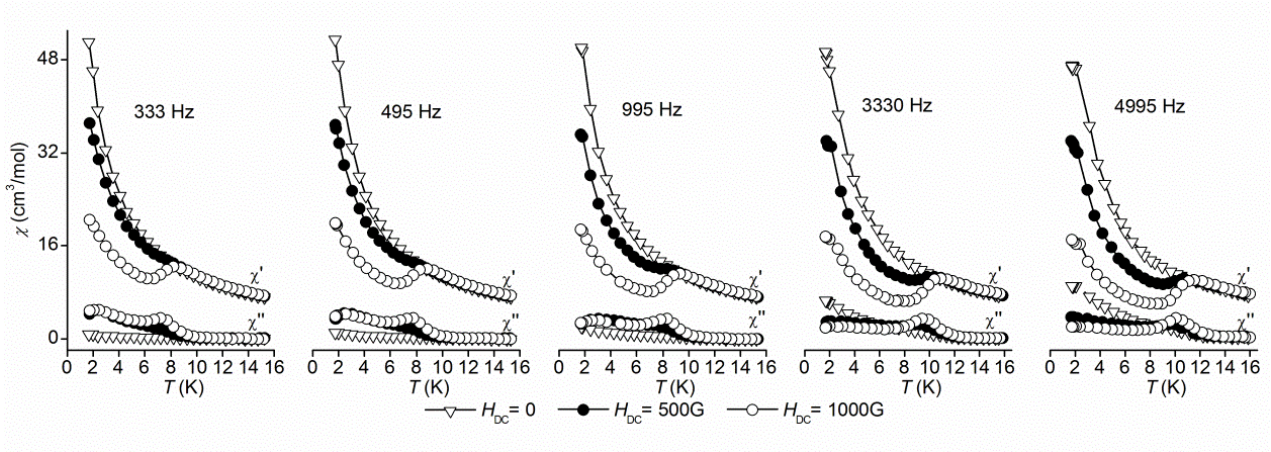

Fig. S6 Plots of the in-phase, χ', and out-of-phase, χ'', AC susceptibility for compound **3** as a function of temperature at fixed frequencies 333, 495, 995, 3330 and 4995 Hz (AC field with amplitude of 10 Oe and static fields H_{DC} of 0 G, 500 G and 1000 G).

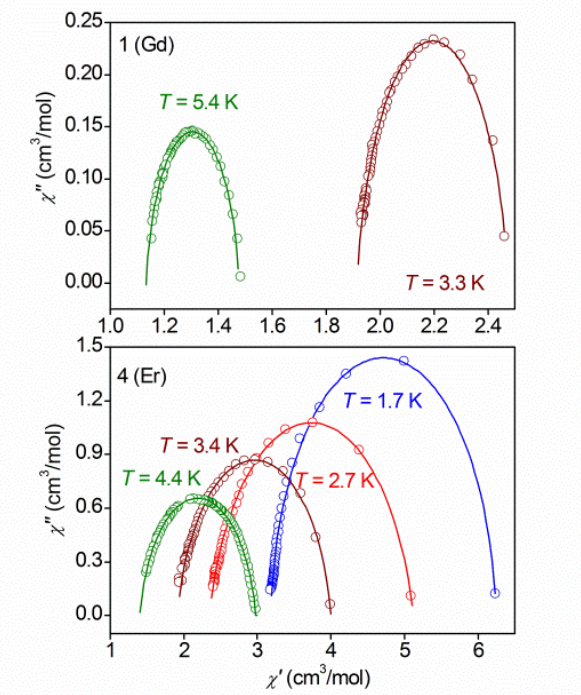

Fig. S7 Cole–Cole plots of χ'' *vs.* χ' of **1** (top) and **4** (bottom)**.** The solid lines represent a least-squares fitting of the data to a distribution of single relaxation processes (Eq. 1).

Table S1 Selected bond lengths (in Å) for compounds **1**, **2**, **3** and **4**.

	1 (Gd^{3+})	**2** (Tb^{3+})	**3** (Dy^{3+})	**4** (Er^{3+})
Ln1-O2	2.335(2)	2.315(1)	2.302(2)	2.289(2)
Ln1-O3	2.442(1)	2.428(1)	2.420(2)	2.398(2)
Ln1-O4	2.475(2)	2.458(2)	2.448(2)	2.421(3)
Ln1-O5	2.320(2)	2.300(1)	2.292(2)	2.260(3)
Ln1-O6	2.432(2)	2.407(1)	2.396(2)	2.377(2)
Ln1-O7	2.380(2)	2.366(1)	2.359(2)	2.336(3)
Ln1-O8	2.375(2)	2.357(1)	2.348(2)	2.313(2)
Ln1-N1	2.597(2)	2.583(2)	2.573(2)	2.552(2)
O1-C6	1.224(3)	1.223(2)	1.226(3)	1.218(4)
O2-C6	1.291(3)	1.290(3)	1.294(3)	1.298(4)
O3-C7	1.268(3)	1.264(2)	1.269(3)	1.270(4)
O4-C7	1.265(3)	1.267(2)	1.264(3)	1.263(4)
O5-C11	1.252(3)	1.252(2)	1.251(3)	1.254(5)
O6-C11	1.264(3)	1.266(2)	1.271(3)	1.269(4)
N1-C1	1.346(3)	1.344(3)	1.347(4)	1.346(5)
N1-C5	1.349(3)	1.346(2)	1.350(3)	1.336(4)
C1-C2	1.389(3)	1.387(3)	1.390(4)	1.387(5)
C2-C3	1.380(3)	1.379(3)	1.375(4)	1.378(5)
C3-C4	1.386(3)	1.385(3)	1.390(4)	1.397(5)
C4-C5	1.384(3)	1.380(3)	1.382(4)	1.388(5)
C5-C6	1.510(3)	1.509(3)	1.510(4)	1.515(5)
C7-C8	1.505(4)	1.503(2)	1.503(4)	1.511(5)
C8-C9	1.527(3)	1.522(3)	1.526(4)	1.529(6)
C9-C10	1.536(3)	1.535(2)	1.545(4)	1.539(5)
C10-C11	1.512(3)	1.504(3)	1.506(3)	1.503(5)

Table S2 Bond angles (º) for compounds **1**, **2**, **3** and **4**.

	1 (Gd^{3+})	**2** (Tb^{3+})	**3** (Dy^{3+})	**4** (Er^{3+})
O2-Ln1-O3	141.65(5)	142.01(5)	142.27(6)	142.85(8)
O2-Ln1-O4	119.79(6)	120.17(5)	120.00(6)	119.93(8)
O2-Ln1-O5	90.71(6)	90.21(5)	90.44(7)	90.36(9)
O2-Ln1-O6	141.64(5)	141.84(5)	141.81(6)	141.65(8)
O2-Ln1-O7	77.43(6)	77.03(5)	77.29(6)	76.79(9)
O2-Ln1-O8	72.59(6)	72.94(5)	72.92(6)	72.94(9)
O2-Ln1-N1	65.39(6)	65.77(5)	66.02(7)	66.42(8)
O3-Ln1-O4	53.05(5)	53.34(5)	53.57(6)	54.16(8)
O3-Ln1-O5	77.20(5)	77.28(5)	77.09(6)	76.94(8)
O3-Ln1-O6	75.99(5)	75.61(5)	75.43(6)	75.14(8)
O3-Ln1-O7	131.26(5)	131.09(5)	130.65(6)	130.40(8)
O3-Ln1-O8	127.18(5)	127.28(5)	127.33(6)	127.58(8)
O3-Ln1-N1	76.37(5)	76.40(5)	76.43(7)	76.67(8)
O4-Ln1-O5	128.87(6)	129.18(5)	129.17(6)	129.49(8)
O4-Ln1-O6	72.05(5)	72.19(5)	72.56(6)	73.06(8)
O4-Ln1-O7	146.77(5)	146.59(5)	146.43(6)	146.52(8)
O4-Ln1-O8	75.93(6)	75.87(5)	75.82(6)	75.71(8)
O4-Ln1-N1	80.79(6)	80.80(5)	80.42(7)	80.07(8)
O7-Ln1-O5	74.35(6)	74.37(5)	74.43(6)	74.41(9)
O7-Ln1-O6	77.66(5)	77.54(5)	77.06(6)	76.94(8)
O7-Ln1-O8	83.96(6)	83.66(5)	83.60(6)	83.29(8)
O7-Ln1-N1	131.70(6)	131.85(5)	132.40(7)	132.54(8)
O8-Ln1-O5	155.17(6)	154.93(5)	155.00(7)	154.79(9)
O8-Ln1-O6	76.18(5)	76.39(5)	76.53(6)	76.66(8)
O8-Ln1-N1	111.18(6)	111.57(6)	111.58(7)	111.67(8)
N1-Ln1-O5	76.35(6)	76.25(5)	76.54(7)	76.84(8)
N1-Ln1-O6	149.31(5)	149.14(5)	149.01(7)	148.97(8)
O6-Ln1-O5	109.93(5)	109.63(5)	109.18(6)	108.77(8)
Ln1-O2-C6	127.2(1)	127.1(1)	127.2(2)	126.9(2)
Ln1-O3-C7	94.0(1)	93.91(1)	93.7(1)	93.3(2)
Ln1-O4-C7	92.6(1)	92.5(1)	92.6(1)	92.4(2)
C11-O5-Ln1	167.8(2)	168.6(1)	169.1(2)	170.0(2)
C11-O6-Ln1	116.1(1)	117.5(1)	118.3(2)	119.3(2)
Ln1-N1-C1	127.3(1)	127.7(1)	127.6(2)	127.5(2)
Ln1-N1-C5	114.8(1)	114.6(1)	114.6(2)	114.9(2)
C1-N1-C5	116.7(2)	116.7(2)	116.7(2)	116.8(3)
N1-C1-C2	123.5(2)	123.4(2)	123.1(3)	123.1(3)

C1-C2-C3	118.8(2)	118.7(2)	119.2(3)	119.4(3)
C2-C3-C4	119.1(2)	118.8(2)	118.6(3)	118.5(3)
C3-C4-C5	118.6(2)	118.8(2)	118.7(3)	117.9(3)
N1-C5-C4	123.5(2)	123.6(2)	123.6(2)	124.4(3)
N1-C5-C6	116.4(2)	116.4(2)	116.1(2)	116.5(3)
C4-C5-C6	120.0(2)	119.9(2)	120.3(2)	119.1(3)
O1-C6-O2	125.0(2)	124.8(2)	124.9(2)	124.9(3)
O1-C6-C5	119.5(2)	119.6(2)	119.6(2)	120.2(3)
O2-C6-C5	115.5(2)	115.5(2)	115.4(2)	114.8(3)
O3-C7-O4	120.2(2)	120.1(2)	120.0(2)	120.0(3)
O3-C7-C8	120.4(2)	120.6(2)	120.2(2)	120.2(3)
O4-C7-C8	119.4(2)	119.3(2)	119.8(2)	119.8(3)
C7-C8-C9	114.8(2)	114.8(2)	114.9(2)	115.0(3)
C8-C9-C10	112.2(2)	112.3(2)	112.3(2)	112.0(3)
C9-C10-C11	111.5(2)	111.5(2)	111.3(2)	111.9(3)
O5-C11-O6	121.8(2)	121.6(2)	121.6(2)	121.9(3)
O5-C11-C10	120.8(2)	120.7(2)	120.6(2)	120.3(3)
O6-C11-C10	117.4(2)	117.6(2)	117.7(2)	117.8(3)