Supporting Information

Acetato-bridged dinuclear lanthanide complexes with single molecule magnet behaviour for the Dy_2 species

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Table S1. Lanthanide geometry analysis by SHAPE 2.1 software.

Ln	Capped square antiprism (C_{4v})	Tricapped trigonal prism (D_{3h})	Square antiprism (D_{4d})	Triangular dodecahedron (D_{2d})
Sm(**1**)	2.092	2.792	#	#
Gd(**2**)	1.970	2.666	#	#
Dy(**3**)	1.917	2.645	#	#
Tm(**4**)	2.095	3.329	#	#
Yb1(**5**)	#	#	3.969	1.690
Yb2(**5**)	2.033	2.707	#	#
Dy(**6**)	2.097	2.824	#	#

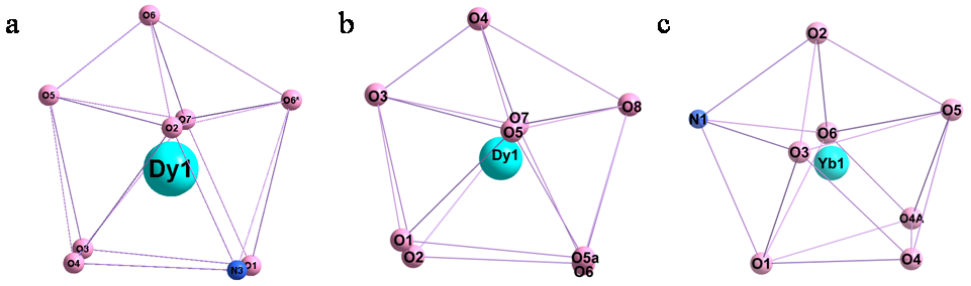


Fig. S1 Coordination polyhedra observed of (a) Dy1, (b) Dy1, (c) Yb1 in complexes **3**, **6** and **5** respectively.

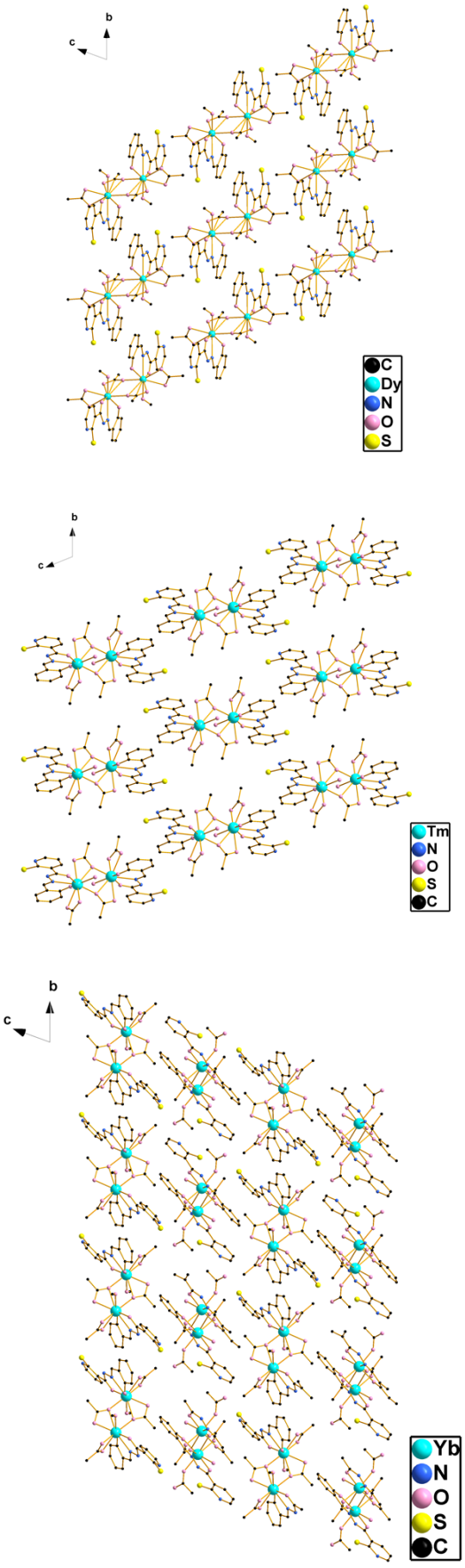


Fig. S2 Molecular packing diagram of complexes **3**, **4**, **5** along ***a*** axis.

Table S2. Ln–Ln distances in molecular packing diagram of complexes **3**, **4**, **5** along ***a*** axis.

Complex	**3**	**4**	**5**
shortest intermolecular Ln-Ln distances for in parallel lines (Å)	12.6992	10.1025	8.4974
shortest intermolecular Ln-Ln distances for between parallel lines (Å)	10.6225	10.9065	10.5314

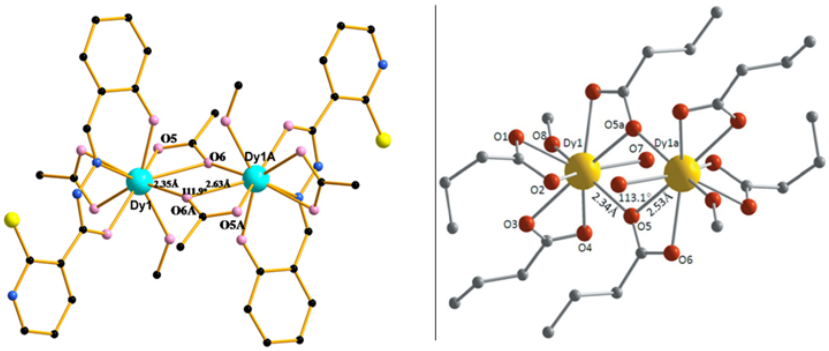
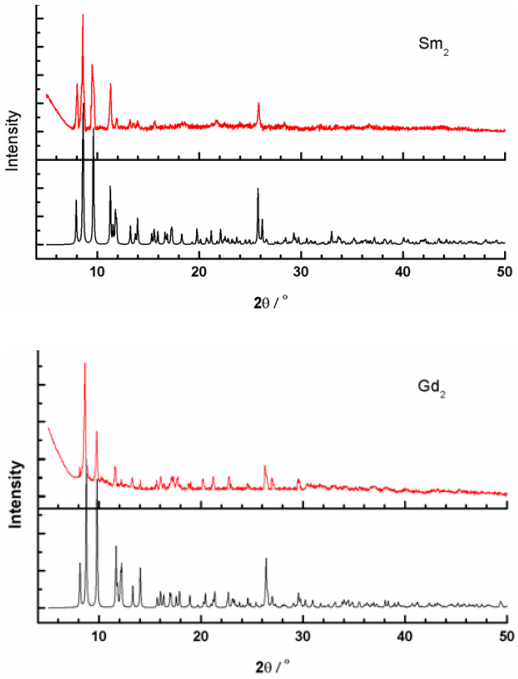


Fig. S3 The molecular structure of complexes **3** (left) and **6** (right, refs 14*a*). Hydrogen atoms are omitted for clarity.



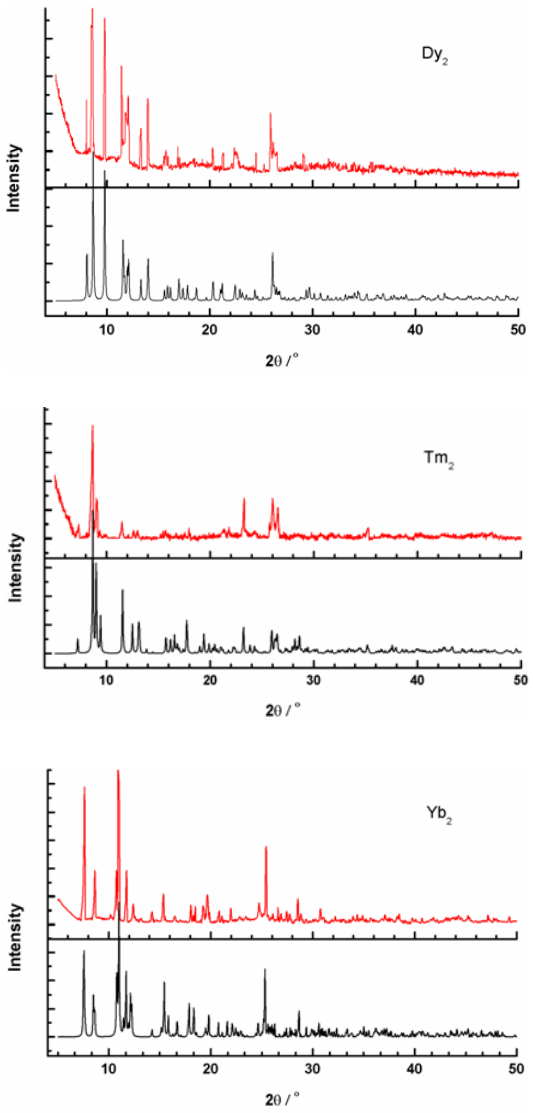


Fig. 4 The experimental XRD patterns (red) and the calculated XRD patterns of single crystal X-ray diffraction data (black) for complexes **1**-**5**.

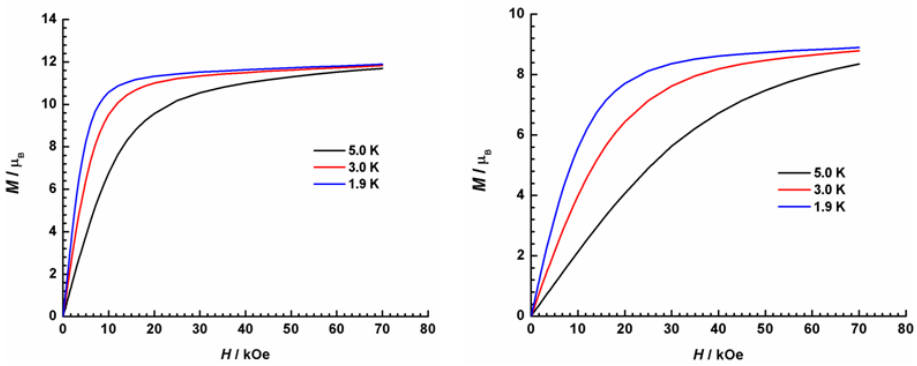


Fig. S5 Field dependence of magnetizations of **3** (left) and **5** (right) at different temperatures below 5 K.

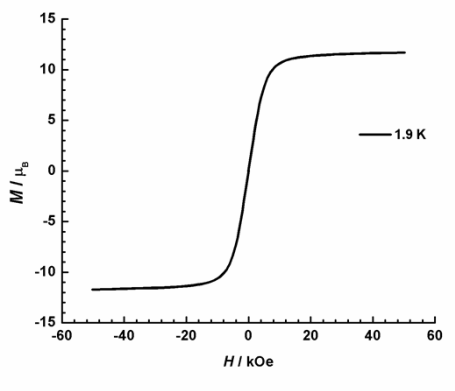


Fig. S6 Hysteresis loops for **3** at 1.9 K.

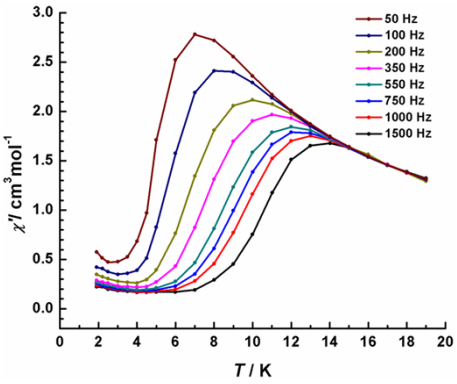


Fig. S7 Temperature dependence of the in-phase (χ') of the ac susceptibility for **3** under zero-dc field. The solid lines are guides for the eyes.

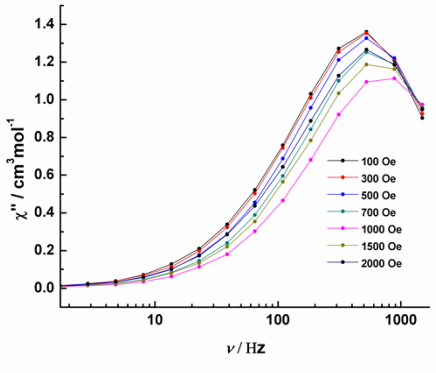


Fig. S8 Frequency dependence of the out-of-phase (χ'') parts of the ac susceptibility for **3** under various magnetic field at 9 K. The solid lines are guides for the eye.

Table S4 Relaxation fitting parameters from the least-square fitting of the Cole-Cole plots according to the generalized Debye model for **3**.

Temperature / K	χ_S / $cm^3mol^{-1}K$	χ_T / $cm^3mol^{-1}K$	τ/ s	α
1.9	0.23697	9.56297	1.13E-01	0.24943
2.2	0.22369	8.71436	9.66E-02	0.23217
2.5	0.21126	7.87979	7.46E-02	0.20992
3.0	0.18547	6.82012	4.48E-02	0.18191
3.5	0.16649	6.01678	2.56E-02	0.16465
4.0	0.14639	5.38099	2.56E-02	0.15326
4.5	0.13844	4.79735	8.48E-03	0.11009
5.0	0.11335	4.47684	5.15E-03	0.14714
6.0	0.08540	3.80817	2.18E-03	0.13750
7.0	0.05798	3.31482	1.03E-03	0.12850
8.0	0.04878	2.93787	5.59E-04	0.12114
9.0	0.07068	2.63777	3.27E-04	0.11032
10.0	0.07707	2.39497	1.85E-04	0.11620
11.0	0.22482	2.18837	1.06E-04	0.09961
12.0	0.34635	2.02223	1.02E-04	0.10292
13.0	0.85480	1.87351	7.39E-05	0.04674