Supporting information

A Series of Tetranuclear Lanthanide Compounds Constructed by *in-situ* Polydentate Ligands: Syntheses, Structures, and the SMM Behaviour of the Dy_4 Compound

Shuang-Yan Lin,[a] Xiao-Lei Li,[b] Hongshan Ke,[c] and Zhikun Xu*[a]

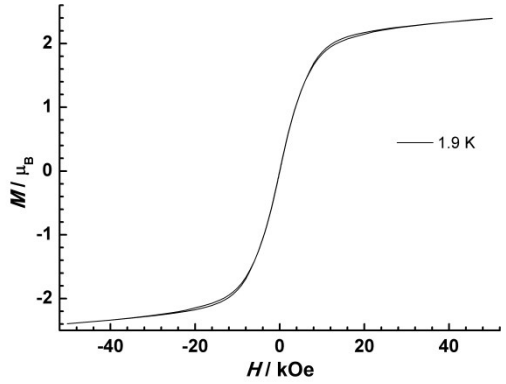

Fig. S1 *M vs. H* data of compound 4 at 1.9 K.

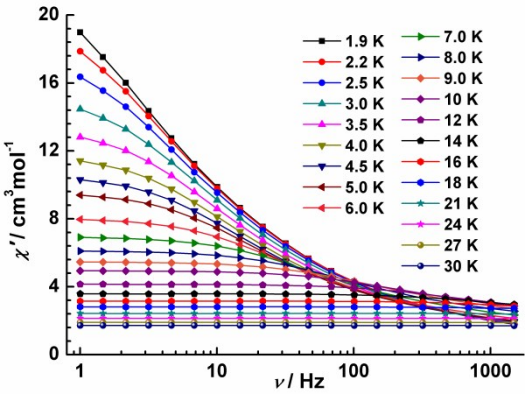

Fig. S2 Frequency dependence of the in phase ac susceptibility of 4 below 30 K, under a zero-dc field. Solid lines are guides for the eyes.

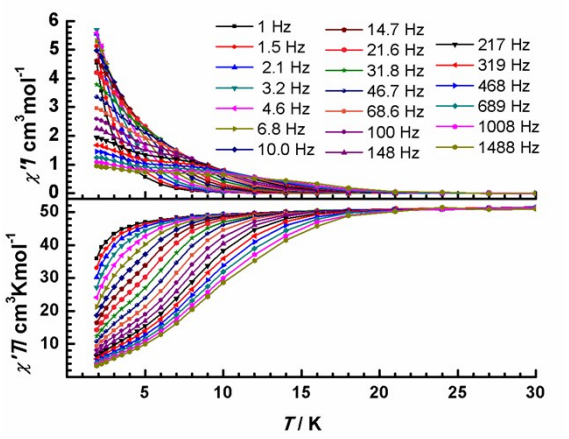

Fig. S3 Temperature dependence of the ac susceptibility for **1** under zero dc field. Solid lines are guides for the eyes.

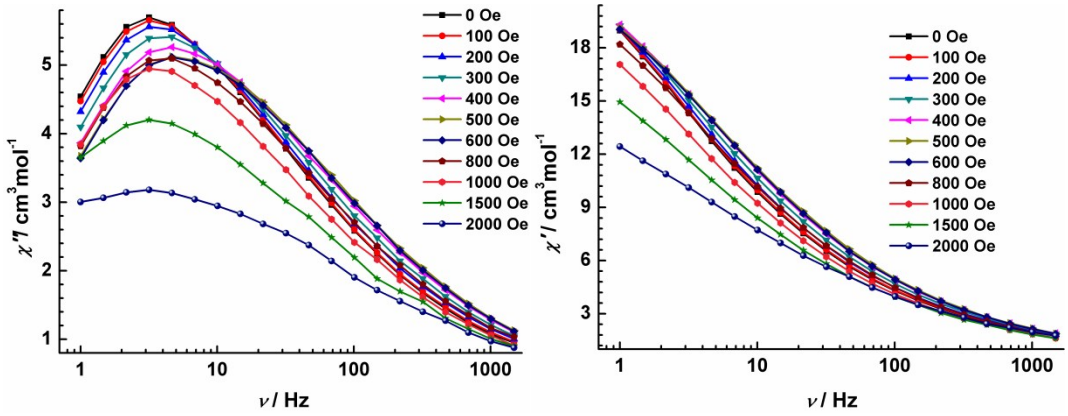

Fig. S4 Frequency dependence of the ac susceptibility at 1.9 K performed at different dc fields for compound 4. Solid lines are guides for the eyes.

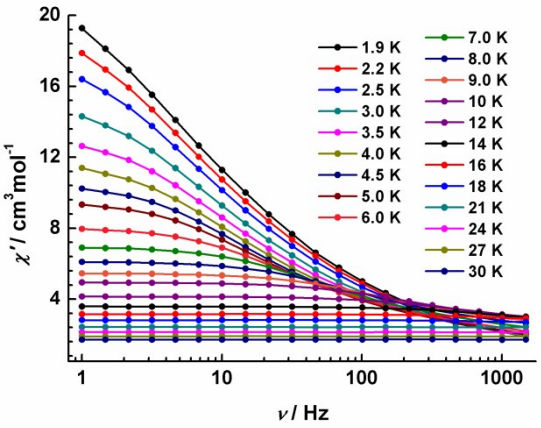

Fig. S5 Frequency dependence of the in-phase ac susceptibility of compound 4 under 500 Oe dc field at 1.9 K. Solid lines are guides for the eyes.

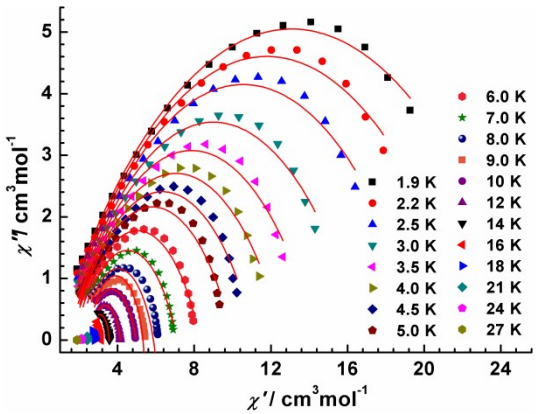

Fig. S6 Cole−Cole plots for compound 2 under zero-dc field below 5 K, solid lines are guides for the eyes. The solid lines are the best fits to the experimental data, obtained with the generalized Debye model.

Table S1. Lanthanide Geometry Analysis by SHAPE Software for Compounds 1-4.

Shape		Capped square antiprism J10	Capped square antiprism	Tricapped trigonal prism
1	Nd1	1.953	0.945	**0.725**
	Nd2	3.769	**1.931**	2.889
2	Sm1	3.570	0.847	**0.696**
	Sm2	1.814	**1.749**	2.759
3	Gd1	1.747	0.802	**0.699**
	Gd2	3.405	**1.623**	2.684
Shape		Square antiprism	Triangular dodecahedron	Bicapped trigonal prism
4	Dy1	4.128	3.743	**3.017**
	Dy2	3.414	**1.760**	2.696

Table S2. Relaxation fitting parameters from Least-Squares Fitting of $\chi(\omega)$ data.

0 field				500 Oe field			
T (K)	χ_s(cm^3mol^{-1})	χ_t(cm^3mol^{-1})	α	*T* (K)	χ_s(cm^3mol^{-1})	χ_t(cm^3mol^{-1})	α
1.9	3.61961	21.83854	0.24746	1.9	0.73991	25.4352	0.50565
2.2	1.06809	23.51895	0.47486	2.2	0.90904	22.68315	0.49048
2.5	1.17322	20.28112	0.4538	2.5	1.04809	20.08098	0.47649
3.0	1.29915	16.92354	0.43031	3.0	1.19981	16.82138	0.4586
3.5	1.38407	14.4908	0.41297	3.5	1.32868	14.40884	0.44009
4.0	1.45571	12.59261	0.39786	4.0	1.41413	12.66948	0.42931
4.5	1.5256	11.16032	0.38487	4.5	1.52361	11.18491	0.4111
5.0	1.59963	10.01827	0.37048	5.0	1.60785	10.03128	0.39643
5.5	1.75284	8.28285	0.3444	6.0	1.78203	8.30976	0.36586
6.0	1.92166	7.07298	0.32768	7.0	1.95675	7.08624	0.34314
7.0	2.11003	6.18395	0.30675	8.0	2.19473	5.87076	0.28418
8.0	2.28938	5.30126	0.26359	9.0	2.49367	5.33115	0.19297
9.0	2.37229	4.62446	0.21296	10.0	2.39614	4.95997	0.27321
10	2.55667	4.09942	0.17608	12.0	2.57773	4.14763	0.20834
12	2.54516	3.55464	0.10145	14.0	2.58622	3.562	0.10169
15				16.0	2.24206	3.15174	0.20069