Supporting Information for

A 2D→2D Polyrotaxane Lanthanide–Organic Framework Exhibiting Slow Magnetic Relaxation Behavior

Cai-Ming Liu,* De-Qing Zhang, and Dao-Ben Zhu

Beijing National Laboratory for Molecular Sciences, Center for Molecular Science, Institute of Chemistry, Chinese Academy of Sciences Beijing 100190, P.R. China

Scheme S1. Coordination modes of the L$^{2-}$ ligands.
**Fig. S1.** TGA of 1 measured under a nitrogen atmosphere in the 25-565 °C temperature range and at a scan rate of 10 °Cmin$^{-1}$.

**Figure S2.** Coordination geometries of Dy1 and Dy2 in 1.
**Figure S3.** AC susceptibilities measured in a 2.5 Oe ac magnetic field with a zero dc-field for 1.

**Figure S4.** Plot of ln(τ) versus 1/T_B for 1, the solid line represents the fitting with the Arrhénius law.
Figure S5. Frequency dependence of the in-phase ($\chi'$, top) and out-of-phase ($\chi''$, bottom) ac susceptibility of 1 at 1.9 K. the solid lines represent the best fitting with the sum of two modified Debye functions.

Table S1. Linear combination of two modified Debye model fitting parameters at 1.9 K of 1 under 2000 Oe DC field.

<table>
<thead>
<tr>
<th>$T$(K)</th>
<th>$\chi_2$(cm$^3$.mol$^{-1}$)</th>
<th>$\chi_1$(cm$^3$.mol$^{-1}$)</th>
<th>$\chi_0$(cm$^3$.mol$^{-1}$)</th>
<th>$\tau_1$(s)</th>
<th>$\alpha_1$</th>
<th>$\tau_2$(s)</th>
<th>$\alpha_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.9</td>
<td>10.92</td>
<td>8.30</td>
<td>3.14</td>
<td>0.02962</td>
<td>0.435</td>
<td>0.00008</td>
<td>0.305</td>
</tr>
</tbody>
</table>