Supporting Information for

Multiple thermal magnetic relaxation in a two-dimensional ferromagnetic dysprosium(III) metal-organic framework

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Table S1. Continuous Shape Measures calculation for the Dy(III) ions in complex 1.

<table>
<thead>
<tr>
<th>Dy1</th>
<th>EP-9</th>
<th>OPY-9</th>
<th>HBPY-9</th>
<th>JTC-9</th>
<th>JCCU-9</th>
<th>CCU-9</th>
<th>JCSAPR-9</th>
<th>CSAPR-9</th>
<th>JTCTPR-9</th>
<th>TCTPR-9</th>
<th>JTDIC-9</th>
<th>HH-9</th>
<th>MFF-9</th>
</tr>
</thead>
</table>

EP-9  1  D9h  Enneagon
OPY-9  2  C8v  Octagonal pyramid
HBPY-9  3  D7h  Heptagonal bipyramid
JTC-9  4  C3v  Johnson triangular cupola J3
JCCU-9  5  C4v  Capped cube J8
CCU-9  6  C4v  Spherical-relaxed capped cube
JCSAPR-9  7  C4v  Capped square antiprism J10
CSAPR-9  8  C4v  Spherical capped square antiprism
JTCTPR-9       9 D3h  Tricapped trigonal prism J51
TCTPR-9        10 D3h  Spherical tricapped trigonal prism
JTDIC-9        11 C3v  Tridiminished icosahedron J63
HH-9           12 C2v  Hula-hoop
MFF-9          13 Cs   Muffin

Dy2, eight-coordination

<table>
<thead>
<tr>
<th>Dy2</th>
<th>OP-8</th>
<th>HPY-8</th>
<th>HBPY-8</th>
<th>CU-8</th>
<th>SAPR-8</th>
<th>TDD-8</th>
<th>JGBF-8</th>
<th>JETBPY-8</th>
<th>JBTPR-8</th>
<th>BTPR-8</th>
<th>JSD-8</th>
<th>TT-8</th>
<th>ETBPY-8</th>
</tr>
</thead>
</table>

OP-8       1  D8h  Octagon
HPY-8      2  C7v  Heptagonal pyramid
HBPY-8     3  D6h  Hexagonal bipyramid
CU-8       4  Oh   Cube
SAPR-8     5  D4d  Square antiprism
TDD-8      6  D2d  Triangular dodecahedron
JGBF-8     7  D2d  Johnson gyrobifastigium J26
JETBPY-8   8  D3h  Johnson elongated triangular bipyramid J14
JBTPR-8    9  C2v  Biaugmented trigonal prism J50
BTPR-8     10 C2v  Biaugmented trigonal prism
JSD-8      11 D2d  Snub diphenoind J84
TT-8       12 Td   Triakis tetrahedron
ETBPY-8    13 D3h  Elongated trigonal bipyramid
Fig. S1. TGA curve for complex 1.
Fig. S2. Frequency dependence of the in-phase ($\chi'$, top) and out-of-phase ($\chi''$, bottom) ac susceptibility of 1 at 2 K. The solid lines represent the best fitting with the sum of two modified Debye functions.

![Graph of $\chi'$ and $\chi''$ vs. frequency at 3 K](image)

Fig. S3. Frequency dependence of the in-phase ($\chi'$, top) and out-of-phase ($\chi''$, bottom) ac susceptibility of 1 at 3 K. The solid lines represent the best fitting with the sum of two modified Debye functions.

![Graph of $\chi'$ and $\chi''$ vs. frequency at 4 K](image)

Fig. S4. Frequency dependence of the in-phase ($\chi'$, top) and out-of-phase ($\chi''$, bottom) ac susceptibility of 1 at 4 K. The solid lines represent the best fitting with the sum of two modified Debye functions.
two modified Debye functions.

**Fig. S5.** Frequency dependence of the in-phase ($\chi'$, top) and out-of-phase ($\chi''$, bottom) ac susceptibility of I at 5 K. The solid lines represent the best fitting with the sum of two modified Debye functions.

**Fig. S6.** Frequency dependence of the in-phase ($\chi'$, top) and out-of-phase ($\chi''$, bottom) ac susceptibility of I at 6 K.
ac susceptibility of 1 at 6 K. the solid lines represent the best fitting with the sum of two modified Debye functions.

**Figure S7.** Plot of $M$ versus $H$ at 1.9 K from $-10000$ to 10000 Oe for 1.

**Figure S8.** The fragment for CASSCF/RASSI calculations. The vectors are the
calculated easy axes (green for Dy1 and pink for Dy2).

**Table S2.** Linear combination of two modified Debye model fitting parameters from 2 K to 6 K of 1 under 2k 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>
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<tr>
<td>2</td>
<td>13.6195</td>
<td>2.87424</td>
<td>0.94387</td>
<td>0.00114</td>
<td>0.40658</td>
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<tr>
<td>3</td>
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<td>3.77649</td>
<td>0.66312</td>
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<td>0.10008</td>
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<tr>
<td>4</td>
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<td>3.7187</td>
<td>0.37426</td>
<td>0.00031</td>
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<td>0.48279</td>
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<tr>
<td>5</td>
<td>5.74306</td>
<td>4.9487</td>
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<td>6</td>
<td>4.90616</td>
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<td>0.2792</td>
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