SUPPORTING INFORMATION

Rational design of triple bridged dinuclear Zn\textsuperscript{II}Ln\textsuperscript{III} based complexes: A structural, magnetic and luminescent study

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3. Continuous Shape Measurements.
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1. Elemental Analyses and Crystallographic Tables.

<table>
<thead>
<tr>
<th>Complex</th>
<th>Yield (%)</th>
<th>Formula</th>
<th>% C calc./found</th>
<th>% H calc./found</th>
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Table S2.- Bond lengths (Å) and angles (°) for compounds 1, 8, 10 and 11.

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<td>2.311(2)</td>
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<td>Ln(1)-O(5A)nitrate</td>
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**Table S3.** Bond lengths (Å) and angles (°) for compounds 1, 8, 10 and 11.

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<th>10</th>
<th>11</th>
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<td>3.3270(4)</td>
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1. Experimental XRPD.

**Figure S1.** Pattern-matching analyses and experimental XRPD for complexes 1, 8, 10 and 11 together with a simulated pattern from single-crystal X-ray diffractions.
Figure S2.- Pattern-matching analyses and experimental XRPD for complexes 2-7, 9 and 12.
2. Continuous Shape Measurements.

Table S4.- Continuous Shape Measurements for the ZnN$_2$O$_3$ coordination environment.

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<th>[ML5]</th>
<th>PP-5</th>
<th>Vac-5</th>
<th>TBPY-5</th>
<th>SPY-5</th>
<th>JTBPY-5</th>
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Table S5.- Continuous Shape Measurements for the LnO₉ coordination environment.

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<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>Comp1 (Y1)</th>
<th>Comp1 (Y2)</th>
<th>Comp8 (Dy1)</th>
<th>Comp8 (Dy2)</th>
<th>Comp10 (Er1)</th>
<th>Comp10 (Er2)</th>
<th>Comp11 (Tm1)</th>
<th>Comp11 (Tm2)</th>
<th>Comp1 (Y1)</th>
<th>Comp1 (Y2)</th>
<th>Comp8 (Dy1)</th>
<th>Comp8 (Dy2)</th>
<th>Comp10 (Er1)</th>
<th>Comp10 (Er2)</th>
<th>Comp11 (Tm1)</th>
<th>Comp11 (Tm2)</th>
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<table>
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<th>JTCTPR-9</th>
<th>TCTPR-9</th>
<th>JTDIC-9</th>
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Figure S3.- Temperature dependence of the out-of phase $\chi''_M$ susceptibility signals for complexes 3 (top), 7 (middle) and 10 (bottom) under an applied field of 1000 Oe.
Figure S4. Temperature dependence of the in phase $\chi_M'$ susceptibility signals for complexes 6 (top), 8 (middle) and 12 (bottom) under an applied field of 1000 Oe.
Figure S5.- Temperature dependence of the in phase $\chi_M$’ susceptibility signals for complexes 3 (top), 7 (middle) and 10 (bottom) under an applied field of 1000 Oe.
Figure S6.- Cole-Cole plots under 1000 Oe field for 6 (top), 8 (middle) and 12 (bottom). Solid lines represent the best fits to the generalized Debye model.
Figure S7.- Variable-temperature frequency dependence of the $\chi_M''$ signal under 1000 Oe applied field for 6 (top), 8 (middle) and 12 (bottom). Solid lines represent the best fitting of the experimental data to the Debye model.
Figure S8.- Temperature dependence of the $\chi_M T$ product at 1000 Oe for complex 6. Inset: M vs. H plot for 6.

4. Luminescence Properties.

Figure S9.- Excitation spectra monitored at 615 nm for 5 (top) and 543 nm for 7 (down) compounds recorded at 10 K.
**Figure S10.** 10 K excitation spectrum of 4 focusing on the 543 nm.

**Figure S11.** 10 K excitation spectrum of 8 focusing on the 572 nm.
Figure S12.- Excitation spectrum at 10 K of 6 under emission at 461 nm, together with emission spectra excited at the 434 and 462 nm maxima.

Figure S13.- Emission spectrum at 300 K of 8 excited at 326 nm.
Figure S14.- Emission spectra at 10 K of 4 excited at 305 nm.

Figure S15.- Emission spectra at 10 K of 5 excited at 368 nm.
Figure S16.- Emission spectra at 10 K of 7 excited at 327 nm.

Figure S17.- Emission spectra at 10 K of 11 excited at 325 nm.
Figure S18.- Luminescence decay curves for 4, 5, 7, and 8 compounds at 10 K.

Figure S19.- Micro-photoluminescence images taken on polycrystalline samples at room temperature.