Electronic Supplementary Information

Assembling 1D magnetic chain based on Octacyanotungstate (V) and [Cu$_2$L$_2$Ln] sub-building units (Ln = Eu, Gd, Tb and Dy)

Xiao-Jiao Song, Zai-Chao Zhang, Yong-Lu Xu, Jun Wang, Hong-Bo Zhou, You Song*

Table S1. Results of the Continuous Shape Measure Analysis

<table>
<thead>
<tr>
<th>Geometry</th>
<th>SAPR-8</th>
<th>BTP-8</th>
<th>DD-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.55</td>
<td>1.53</td>
<td>1.69</td>
</tr>
<tr>
<td>2</td>
<td>0.56</td>
<td>1.50</td>
<td>1.68</td>
</tr>
<tr>
<td>3</td>
<td>0.57</td>
<td>1.47</td>
<td>1.76</td>
</tr>
<tr>
<td>4</td>
<td>0.58</td>
<td>1.51</td>
<td>1.62</td>
</tr>
</tbody>
</table>

*SAPR-8 is the shape measure relative to the square antiprism; BTP-8 is the shape measure relative to the bicapped trigonal prism; DD-8 is the shape measure relative to the dodecahedron.

Fig. S1 A view of the interchain linking in 1 via hydrogen bonds, H atoms and other solvents in crystal lattice have been omitted for the clarity. Symmetry code: A= -1+x, -1+y, z; x, -1+y, z.

Fig. S2 Temperature dependence of susceptibility of complex 1 in the field of 100 Oe.
Fig. S3 Temperature dependence of susceptibility of complex 2 in the field of 100 Oe.

![Graph showing temperature dependence of susceptibility](image)

C(2) = 9.13 cm$^3$ mol$^{-1}$ K
θ(2) = 2.38 K

Fig. S4 Temperature dependence of the reciprocal of susceptibility of complex 2. The red line is the fitting result by Curie-Weiss law.

![Graph showing temperature dependence of reciprocal susceptibility](image)
**Fig. S5** Temperature dependence of the AC in-phase, $\chi'$ (top), and out-of phase, $\chi''$ (bottom), components of the ac susceptibility of complex 2, $H_{dc}=0$, $H_{ac}=30$e.

**Fig. S6** Temperature dependence of in-phase, $\chi'$ (top), and out-of phase, $\chi''$ (bottom), components of the ac susceptibility of complex 3, $H_{dc}=0$, $H_{ac}=30$e.
**Fig. S7** Temperature dependence of the out-of phase ac susceptibility of complex 3, $H_{dc} = 2$ kOe, $H_{ac} = 3$ Oe.

**Fig. S8** Temperature dependence of susceptibility of complex 3 in the field of 100 Oe.

**Fig. S9** Temperature dependence of susceptibility of complex 4 in the field of 100 Oe.
Fig. S10 Temperature dependence of in-phase, $\chi'$ (top), and out-of phase, $\chi''$ (bottom), components of the ac susceptibility of complex 4, $H_{dc}= 0$, $H_{ac} = 30$e.

Fig. S11 Temperature dependence of the out-of phase ac susceptibility of complex 4, $H_{dc}= 2$ kOe, $H_{ac} = 30$e.