Electronic Supplementary Information

$\{Ni^{II}_8Ln^{III}_6\}$ (Ln=Gd, Dy) rod-like nano-sized heteronuclear coordination cluster with a double carbonate bridge skeleton and remarkable MCE behaviour

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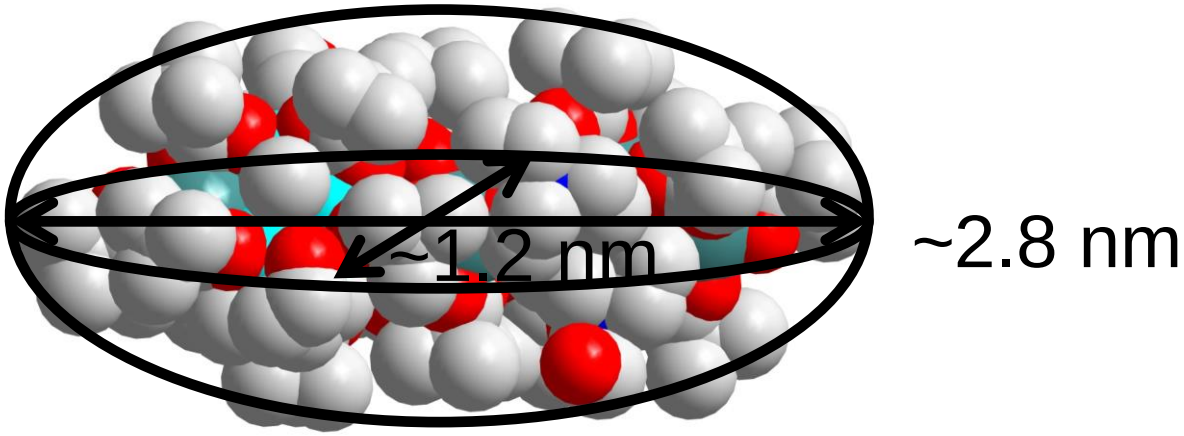


Figure ESI1. Space filling representation of Ni_8Dy_6 complexes showing their rod-like overall shape.

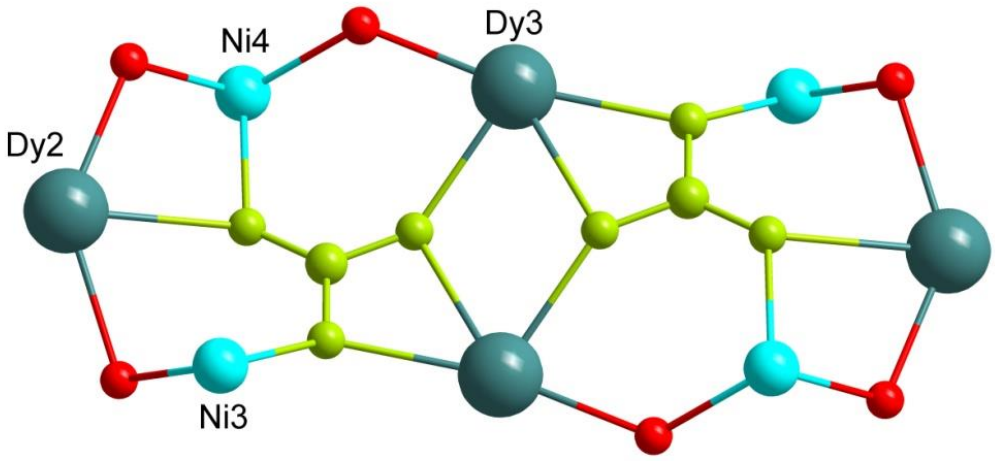


Figure ESI2. Molecular representation of the central double μ_5-carbonate bridged octanuclear $\{Ni_4Dy_4\}$ moiety. Carbonate bridges are green highlighted.

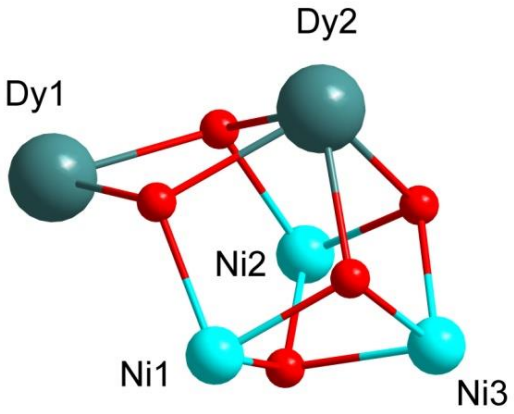
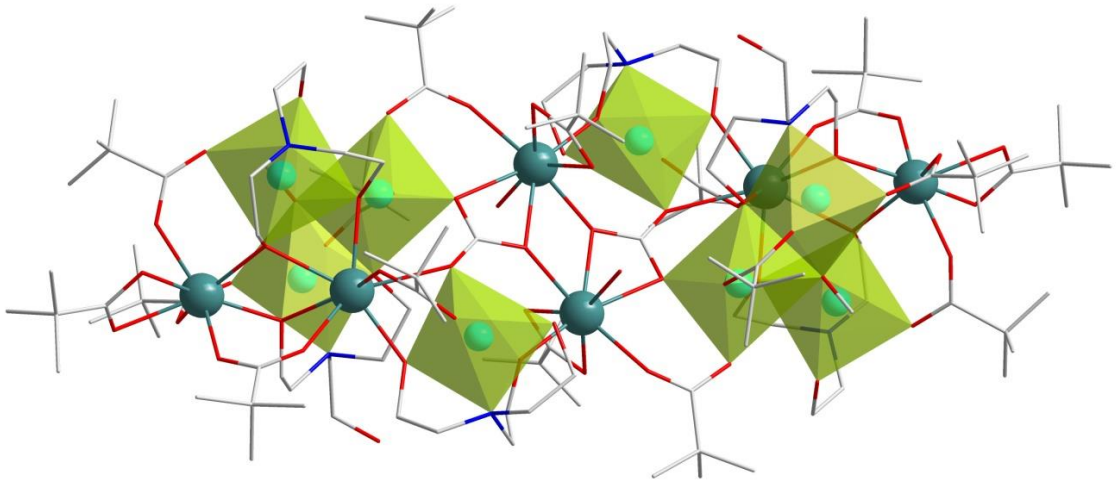


Figure ESI3. Molecular representation of the opened cubane Ni_3Dy units located at both sides of the central octanuclear $\{Ni_4Dy_4\}$ moiety.



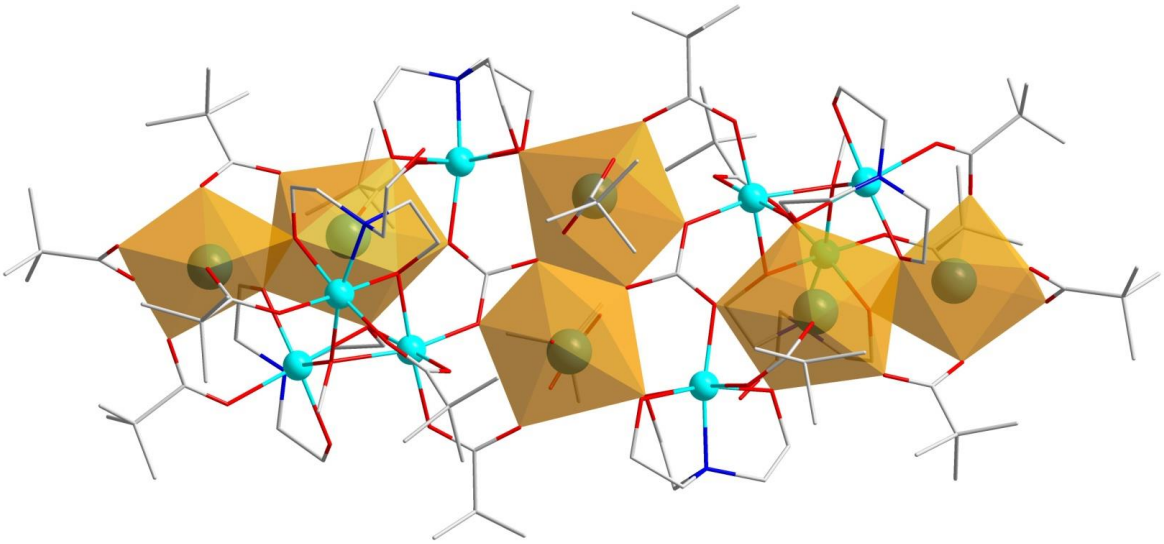


Figure ESI4. Polyhedra representation of coordination environment of all Ni(II) sites (top) and all Dy(III) sites (bottom).

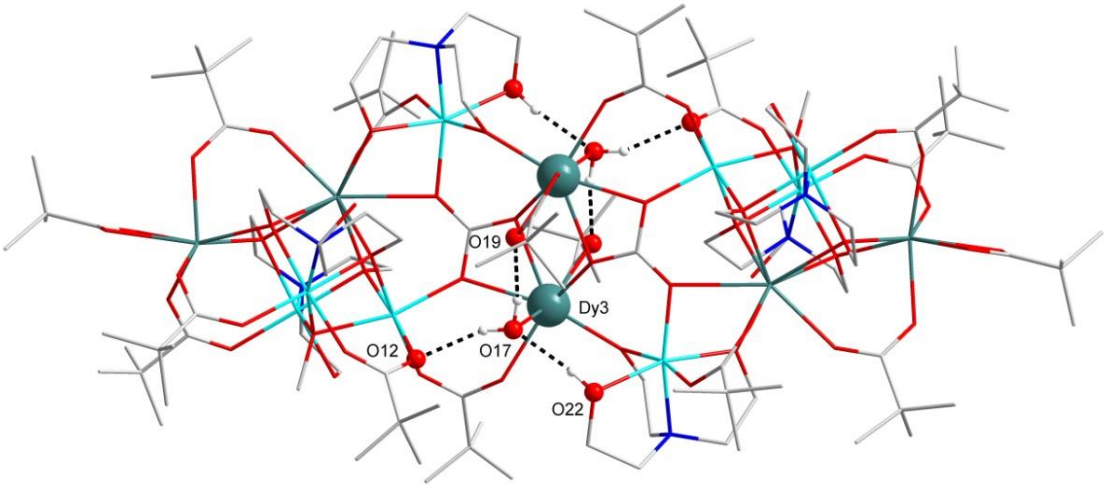


Figure ESI5. Intra-molecular H-bond interactions present in complex Ni_8Dy_6.

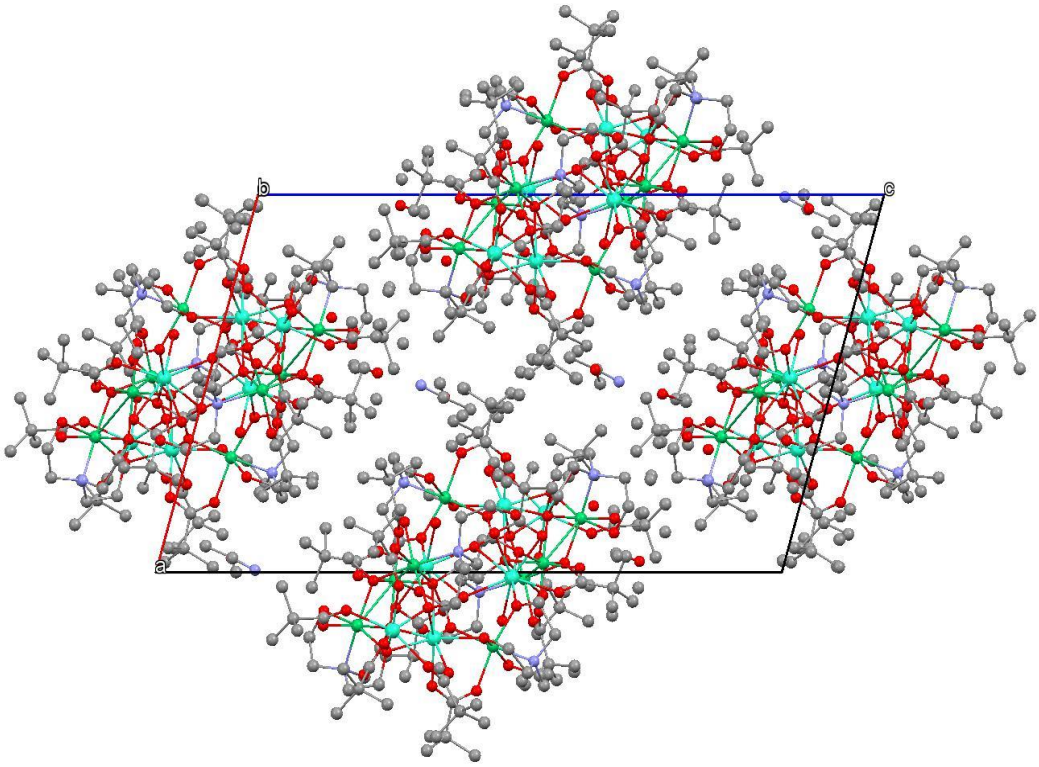


Figure ESI6. Unit cell crystal packing of Ni_8Dy_6. View along monoclinic *b*-axis.

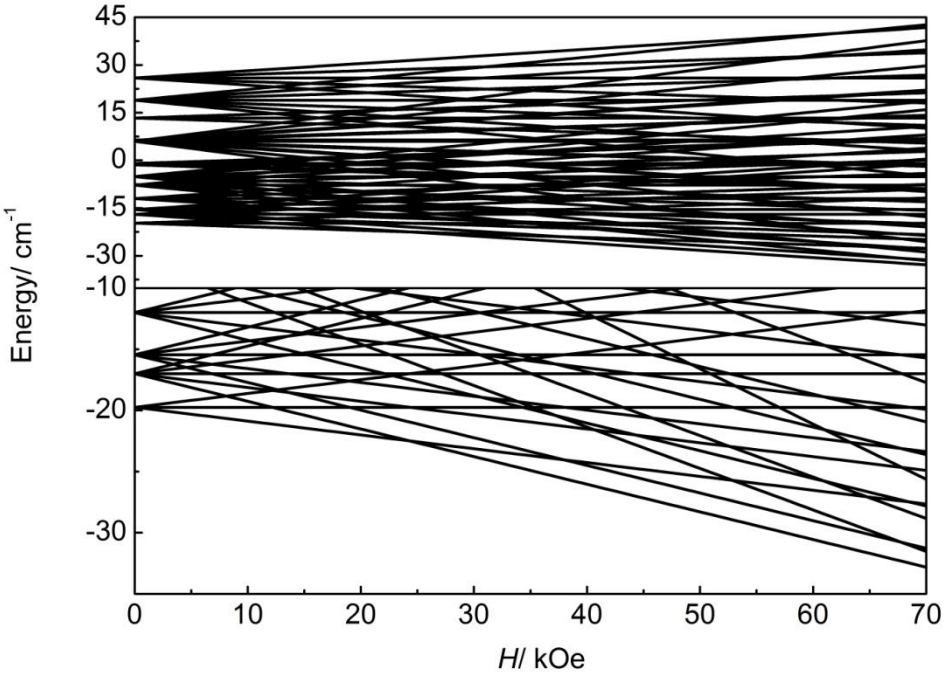


Figure ESI7. Spin ladder energies arising from Ni_4 model fitting (see text).

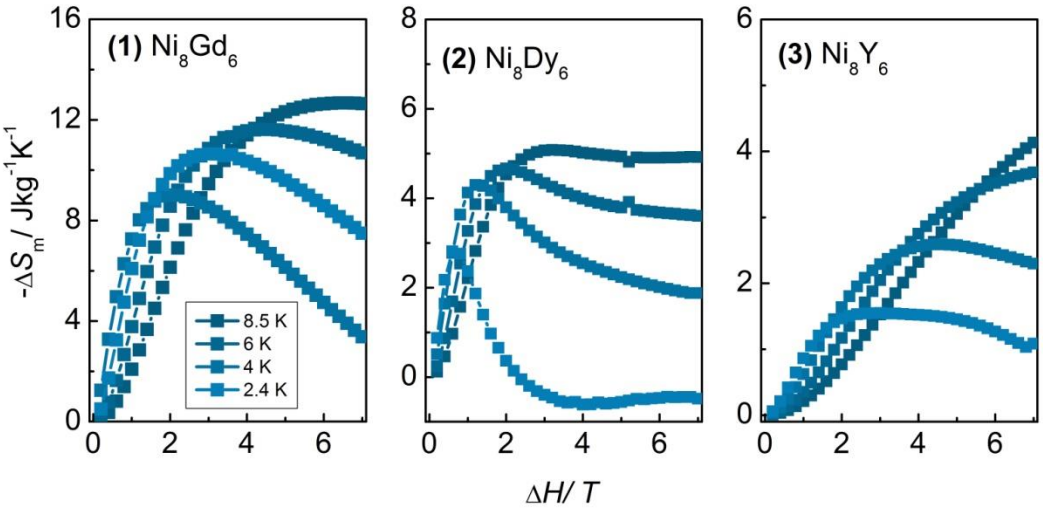


Figure ESI8. Magnetic entropy change field dependence at different fixed temperatures of complexes **1-3**, as evaluated from magnetization data.

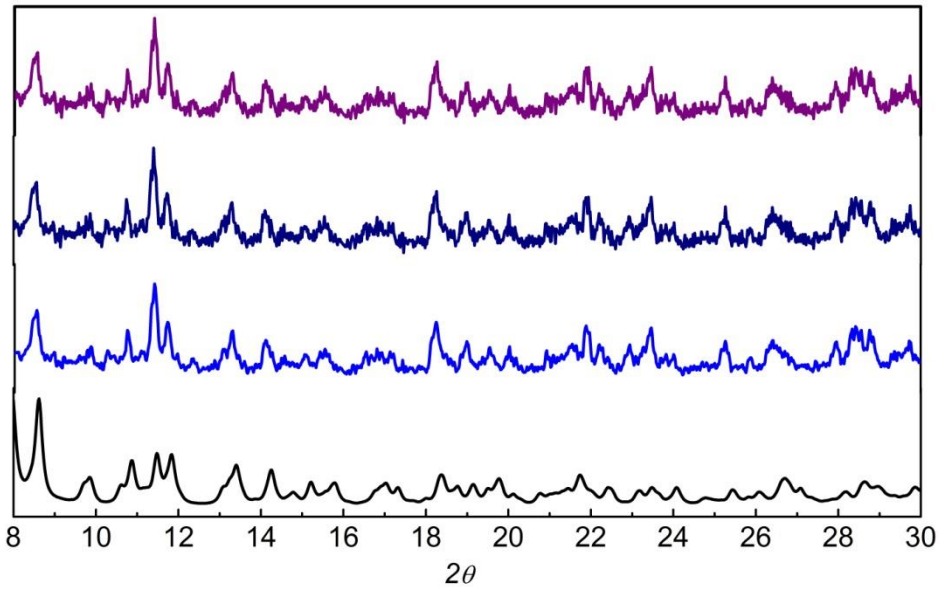


Figure ESI9. PXRD of complexes **1-3** (top to bottom) at room temperature. Black: single crystal simulated PXRD.