

Supplementary data

Synthesis, structural and magnetic studies of an isostructural family of mixed 3d/4f tetranuclear 'star' clusters

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Synthesis

Compounds **1** and **2** were synthesised via the reaction of $\text{Mn}(\text{acac})_3$ (1.5 mmol) and the appropriate $\text{Ln}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$ (0.5 mmol) in 50 mL of MeOH, followed by the addition of triethanolamine (1 mmol) and triethylamine (4.4 mmol), which gave a deep brown/green solution. The mixture was then stirred under reflux, after-which the solvent was removed and redissolved in a dichloromethane/hexane solution (1:1, 50 ml). Quick evaporation over two days led to the formation of brown hexagonal rods of **1** and **2**. The analogous reaction was performed using $\text{Fe}(\text{acac})_3$ (1.5 mmol) which formed a deep red solution and resulted in yellow parallelogram plates of **3** and **4**. Products **1** - **4** were purified in the crystalline phase by three successive washing with acetone to dissolve unreacted starting material. Anal. Calc. (found) for **1** ; $\text{C}_{57}\text{H}_{87}\text{N}_2\text{O}_{24}\text{Mn}_4\text{Gd}$, 43.85 (43.98); H, 5.62 (5.69); N, 1.79 (1.75). Anal. Calc. (found) for **2** ; $\text{C}_{57}\text{H}_{87}\text{N}_2\text{O}_{24}\text{Mn}_4\text{Dy}$, 43.70 (43.25); H, 5.60 (5.54); N, 1.79 (2.06). Anal. Calc. (found) for **3** ; $\text{C}_{42}\text{H}_{66}\text{N}_2\text{O}_{18}\text{Fe}_3\text{Gd}$, 41.63 (41.48); H, 5.49 (5.49); N, 2.31 (2.56). Anal. Calc. (found) for **4** ; $\text{C}_{42}\text{H}_{66}\text{N}_2\text{O}_{18}\text{Fe}_3\text{Dy}$, 41.45 (42.12); H, 5.47 (5.45); N, 2.30 (2.28).

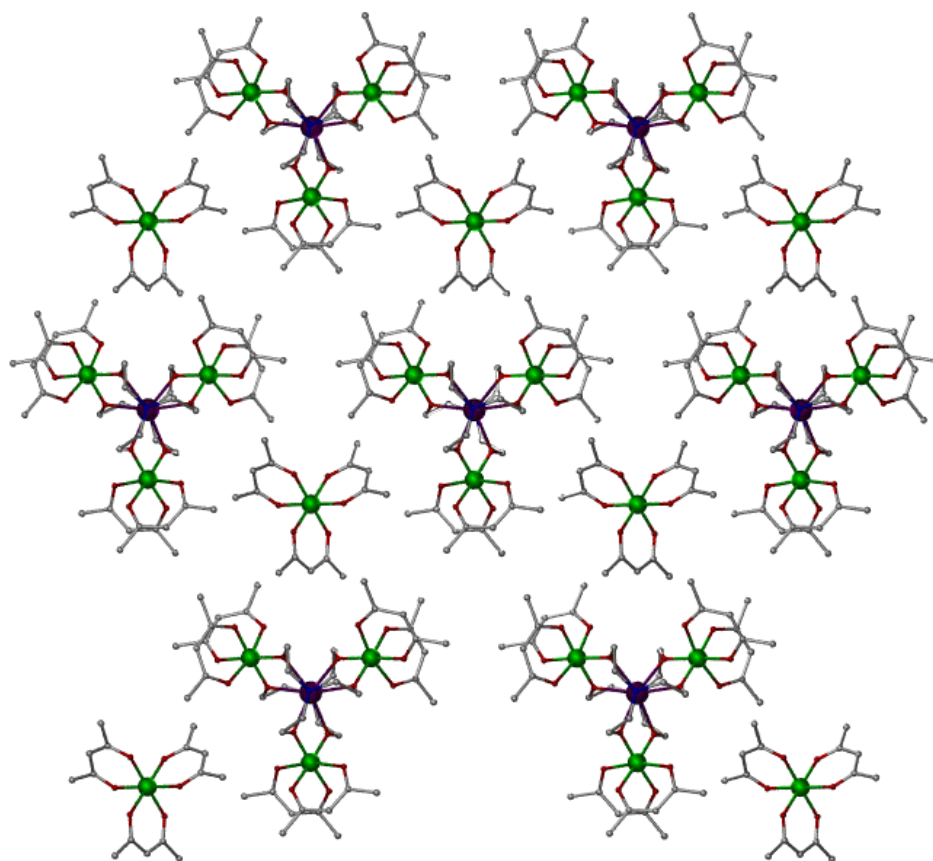


Fig. S1. Packing diagram of **1** and **2**.

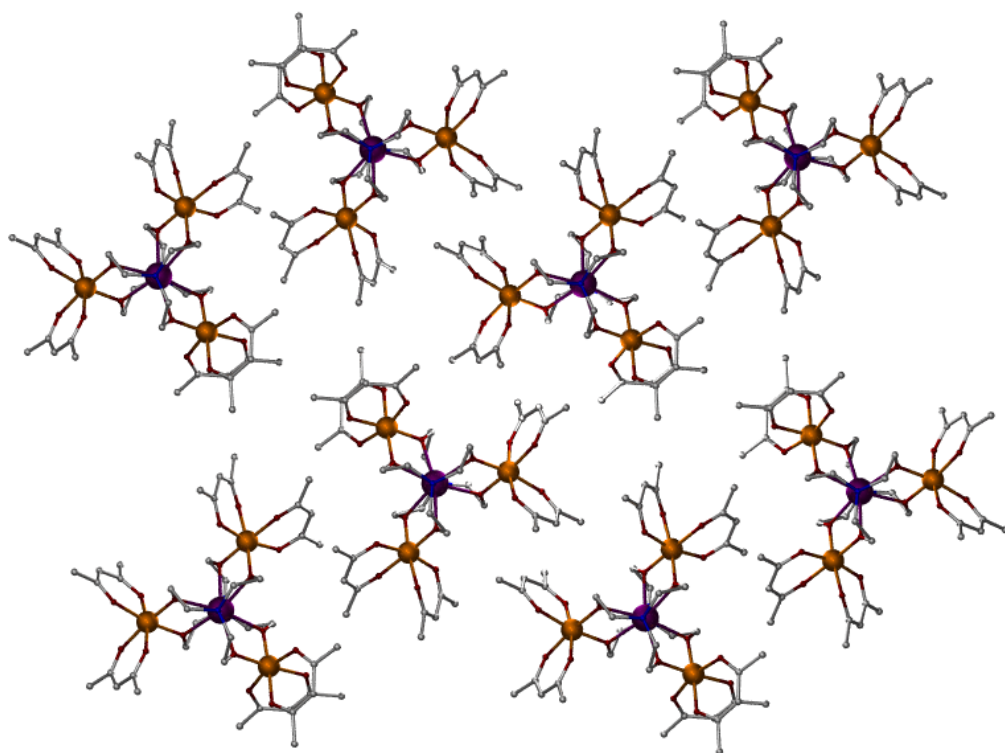


Fig. S2. Packing diagram of **3** and **4**.

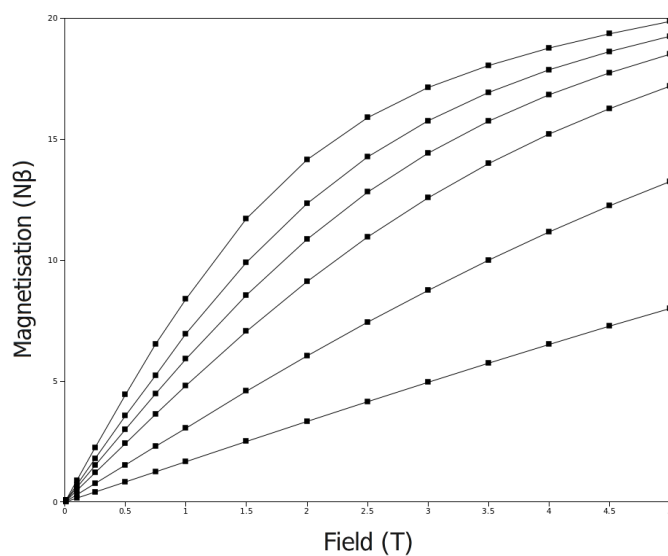


Fig. S3. *M* vs *H* isothermal plots for **1** in the 2 (top) – 20 K (bottom) temperature range (right), the solid lines are guides for the eye.

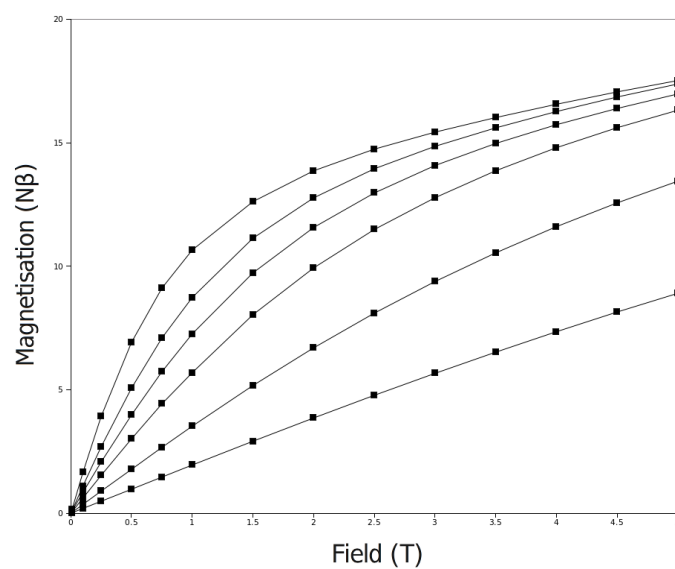


Fig. S4. *M* vs *H* isothermal plots for **2** in the 2 (top) – 20 K (bottom) temperature range (right), the solid lines are guides for the eye.

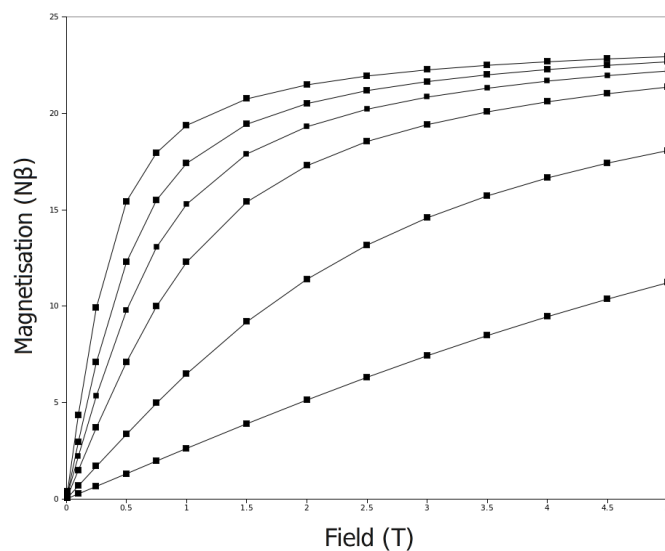


Fig. S5. M vs H isothermal plots for **3** in the 2 (top) – 20 K (bottom) temperature range (right), the solid lines are guides for the eye.

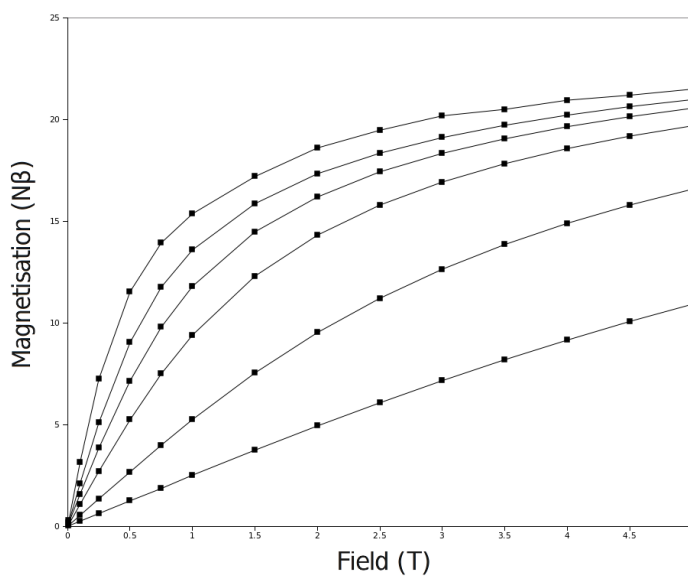


Fig. S6. M vs H isothermal plots for **4** in the 2 (top) – 20 K (bottom) temperature range (right), the solid lines are guides for the eye.