Electronic Supplementary Information (ESI)

A cationic and ferromagnetic hexametallic Mn(III) Single-Molecule Magnet based on the salicylamidoxime ligand

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Preparation of 1. All manipulations were performed under aerobic conditions, using materials and solvents as received. Mn(ClO$_4$)$_2$·6H$_2$O (0.249 g, 6.88 mmol) was dissolved with continuous stirring in EtOH (20 mL), then H$_2$N-saoH$_2$ (0.102 g, 6.70 mmol) was added followed by pyridine (1 mL, 12.4 mmol) and NEt$_3$ (0.05 mL, 3.58 mmol). The dark green final solution was left to evaporate in a fume hood at room temperature. Dark green crystals were formed in 1 day, which were suitable for X-ray diffraction studies. Yield: 72%. Anal. Cald. (found) for C$_{76}$H$_{78}$O$_{24}$N$_{18}$Cl$_2$Mn$_6$ (1): C, 45.0 (45.5); H, 3.9 (4.1); N, 12.4 (12.3) %. IR peaks (ATR/cm$^{-1}$): 1597, 1086, 1036, 1017, 878, 700, 673, 638, 628.

A)
**Figure S1.** (A) Perspective view of the unidimensional arrangement of \([\text{Mn}_6(\mu_3-O)_2(\text{H}_2\text{N-sao})_6(\text{py})_6(\text{EtOH})_2]^{2+}\) cations and \(\text{ClO}_4^-\) anions in 1 through H-bonding interactions (dashed lines). Solvent molecules have been omitted for clarity. [Colour code: pink, Mn; red, O; blue, N; black, C; green, Cl]. (B) Expansion of this interaction into 2 dimensions, highlighting the H-bonded square sheets. (C) View of the interdigitated Mn$_6$ cluster cations in the third dimension.
Figure S2. Two $J$ coupling exchange model used for the fit of compound 1.
Figure S3. Plot of the reduced magnetisation ($M/N\mu_B$ vs. $H/T$) for 1 in 4, 5, 6 and 7 T fields and temperatures 2–7 K. The solid lines represent the best fit of the experimental data with $S = 12$, $g = 1.98 \pm 0.02$ and $D_{\text{cluster}} = -0.34 \pm 0.02$ cm$^{-1}$.