Syntheses, Structures and Magnetic Properties of Low-Dimensional Heterometallic Complexes Based on the Versatile Building Block $[(Tp)Cr(CN)_3]^-$

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Supporting information

Table S1 Selected bond lengths (Å) and angles (°) for **4**

Cr1—N10	2.034(4)	Cr1—N8	2.042(3)
Cr1—C35	2.039(5)	Cr1—N6	2.059(4)
Cr1—C34	2.069(5)	Cr1—C33	2.086(5)
Mn1—N12#1	2.193(3)	Mn1—N11	2.192(4)
Mn1—N1	2.239(4)	Mn1—N3	2.259(4)
Mn1—N4	2.279(3)	Mn1—N2	2.289(4)
N11—C33—Cr1	172.9(4)	N12—C34—Cr1	171.6(4)
C33—N11—Mn1	156.2(4)	C34#1—N12#1—Mn1	147.6(4)
N12#1—Mn1—N11	99.31(1)	N12#1—Mn1—N1	98.71(1)
N11—Mn1—N1	95.66(1)	N12#1—Mn1—N3	92.79(1)
N11—Mn1—N3	92.59(3)	N11—Mn1—N4	91.67(2)
N1—Mn1—N4	93.40(1)	N3—Mn1—N4	73.29(1)
N1—Mn1—N2	73.55(1)		

Symmetry transformations used to generate equivalent atoms: #1: 1-x, 2-y, 2-z.

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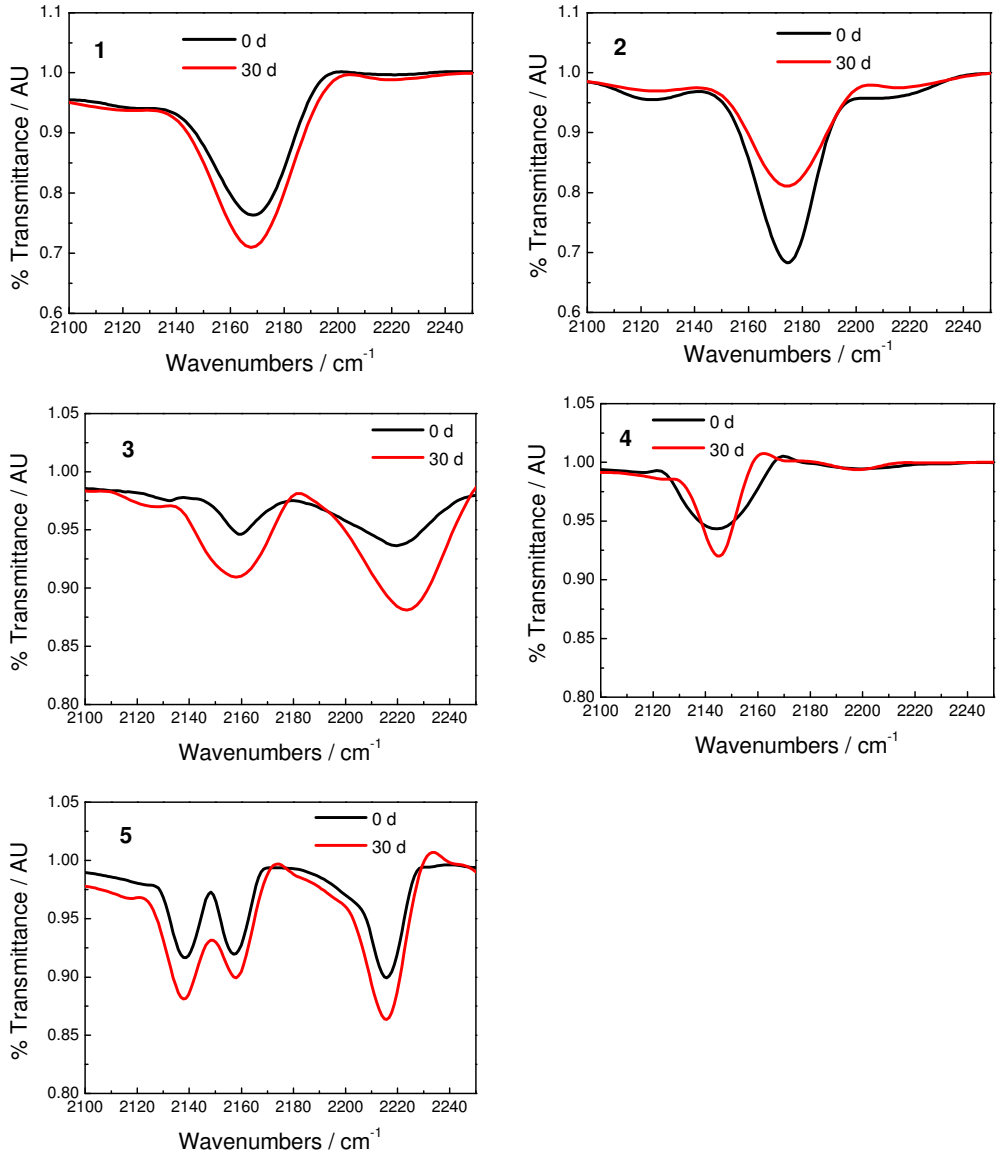

Figure S1 (a): Time-resolved IR spectra for a pulverized sample of **1**–**5** at room temperature for 30 days' intervals.

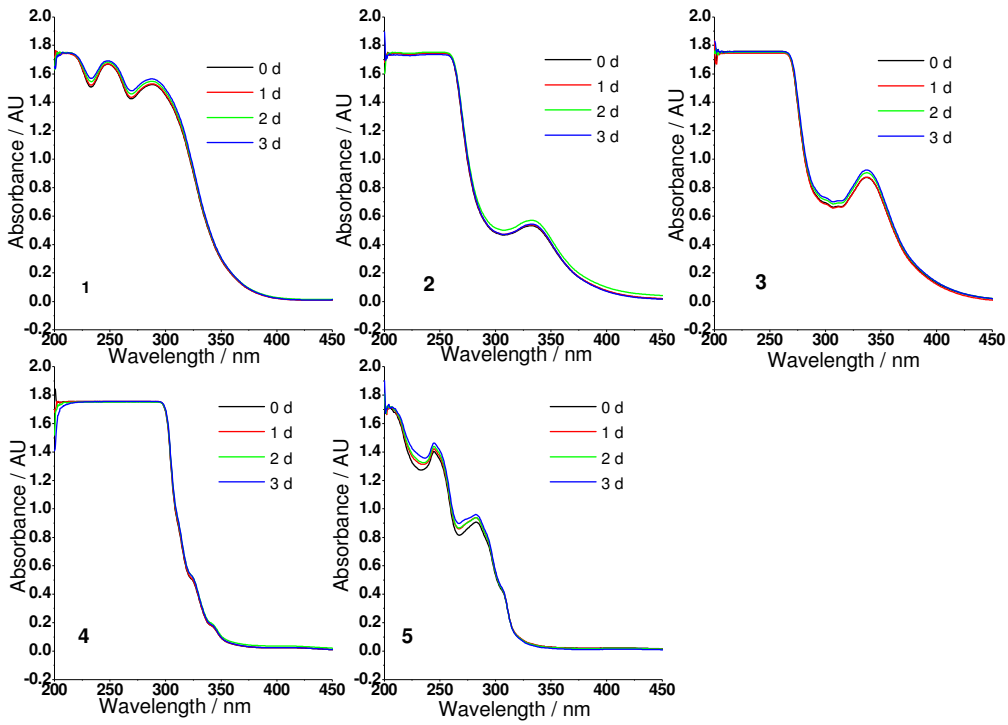

Figure S1 (b): UV-visible spectra collected at one day intervals for a room-temperature solution of **1**–**5** in a 2 : 1 mixture of acetonitrile and methanol.

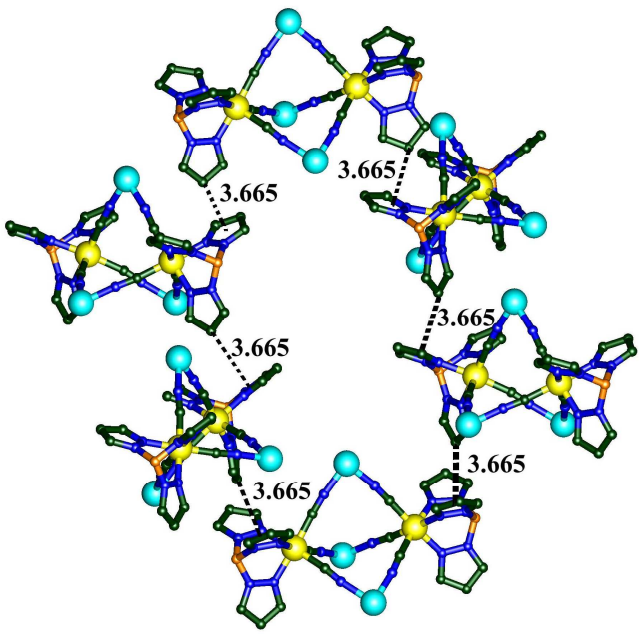

Figure S2 Illustration of the T-shaped C–H···π interactions (black dash lines) of complex **1**. H atoms and Me3tacn are omitted for clarity.

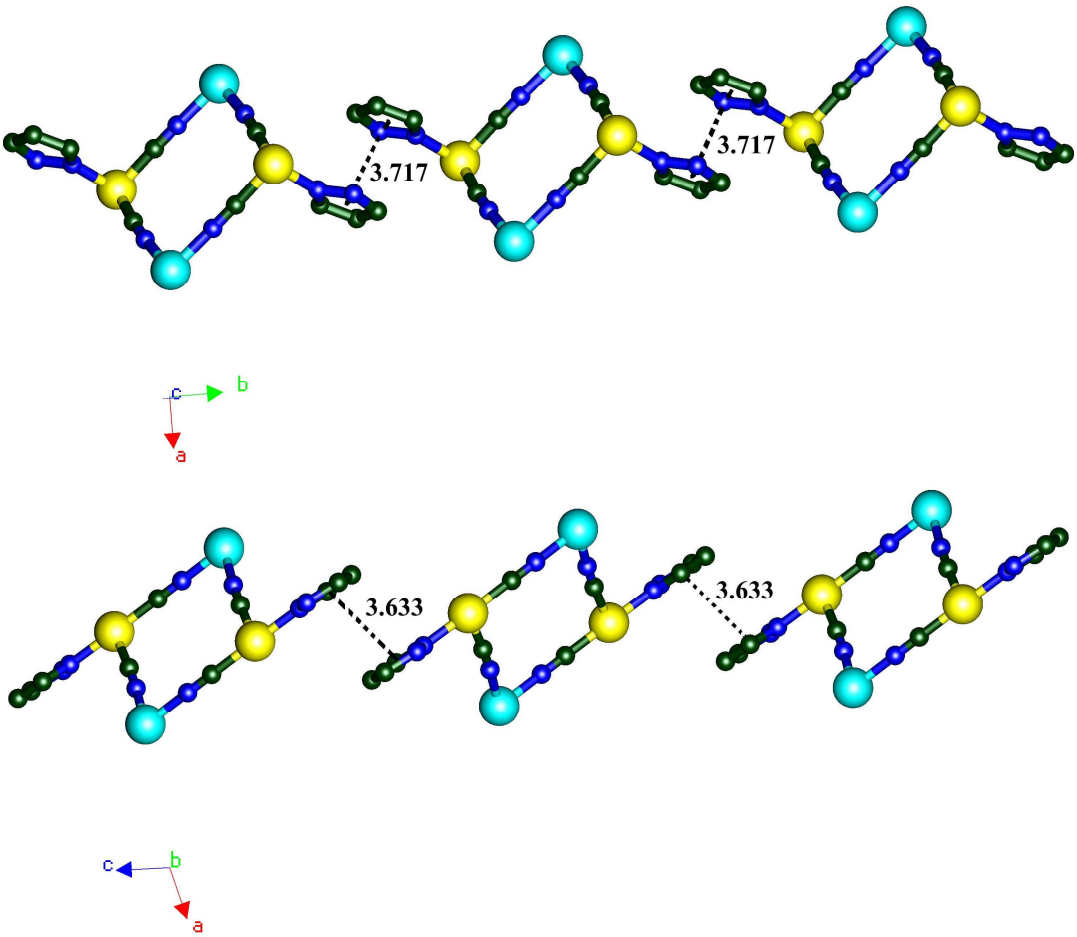

Figure S3 A view to show the chains formed by π···π interactions (black dash lines) of the nearby pyrazole rings in complex **2**.

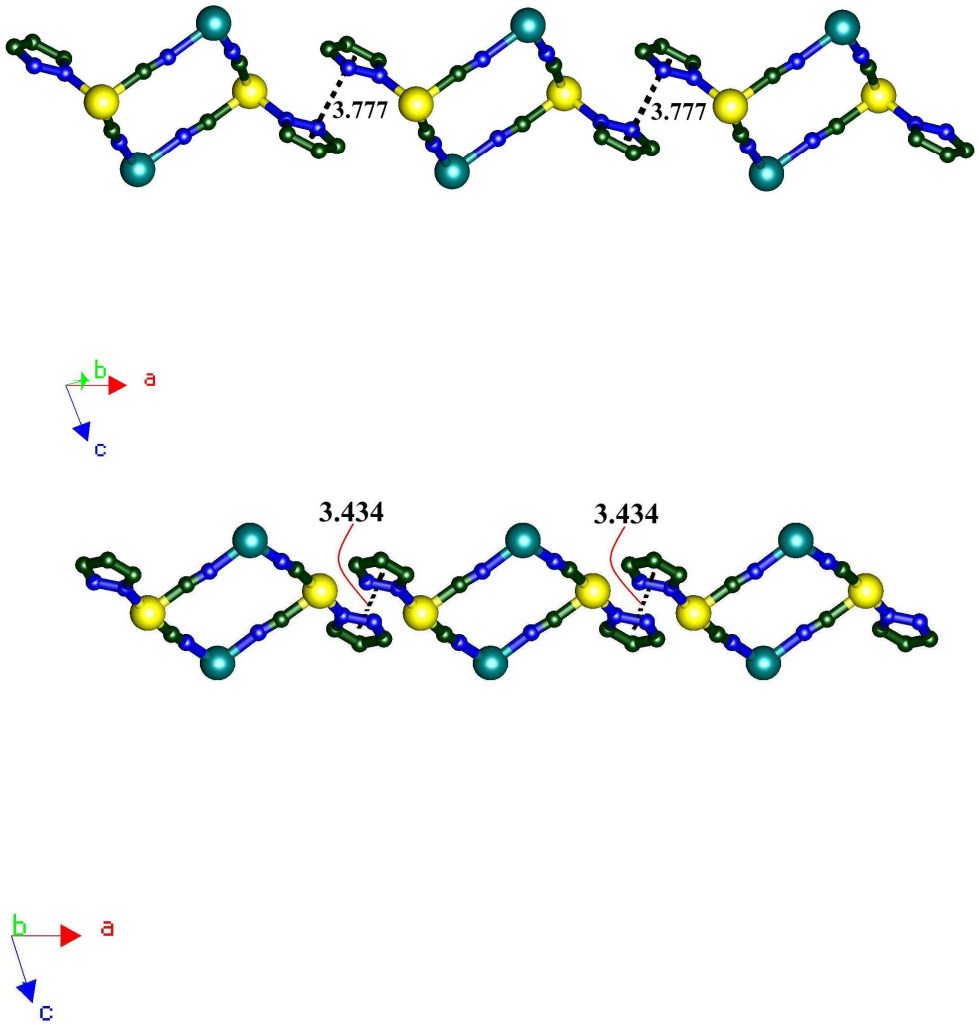

Figure S4 A view to show the chains formed by π···π interactions (black dash lines) of the nearby pyrazole rings in complex **3**.

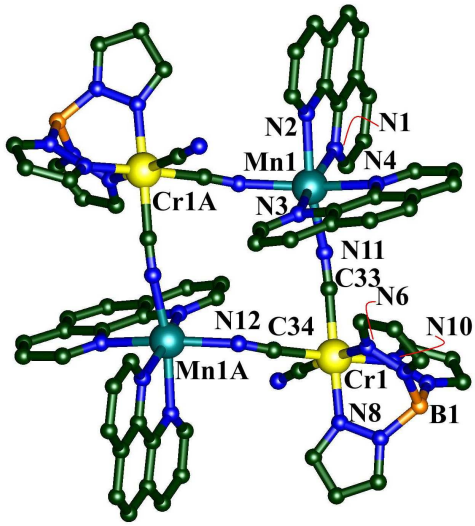

Figure S5 Perspective drawing of the tetranuclear cluster of complex **4** showing the atom numbering. H atoms are omitted for clarity.

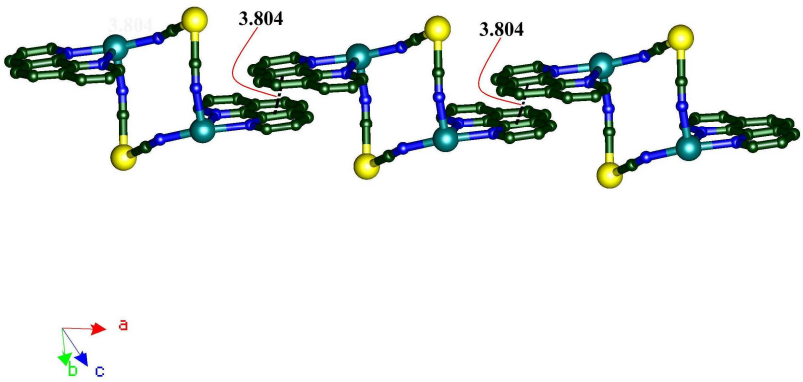

Figure S6 A view to show the chains formed by π···π interactions (black dash lines) of the nearby phen rings in complex **4**.

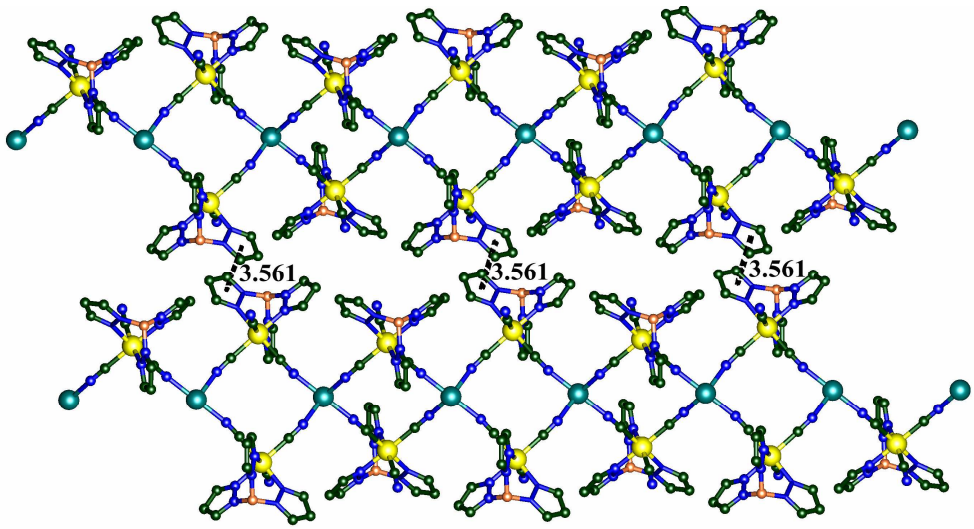

Figure S7 A view to show 2D layer formed by π···π interactions (black dash lines) of the nearby pyrazole rings in complex **5**.

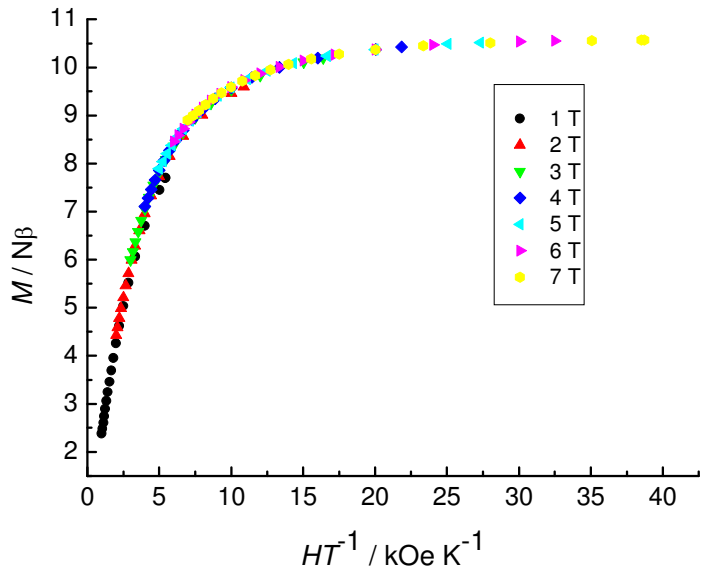

Figure S8 Reduced magnetization data at low temperatures for complex **1**.

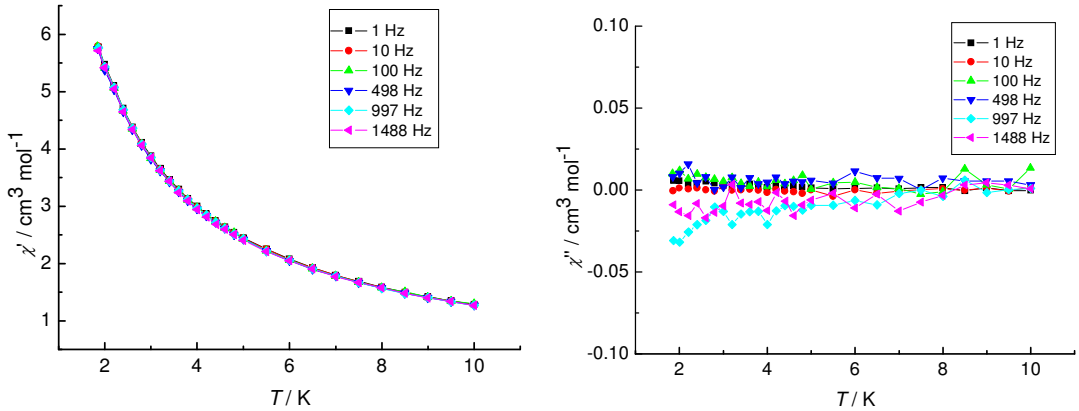

Figure S9 Temperature dependence of the in-phase χ' and out-of-phase χ'' at different frequencies for **1**.

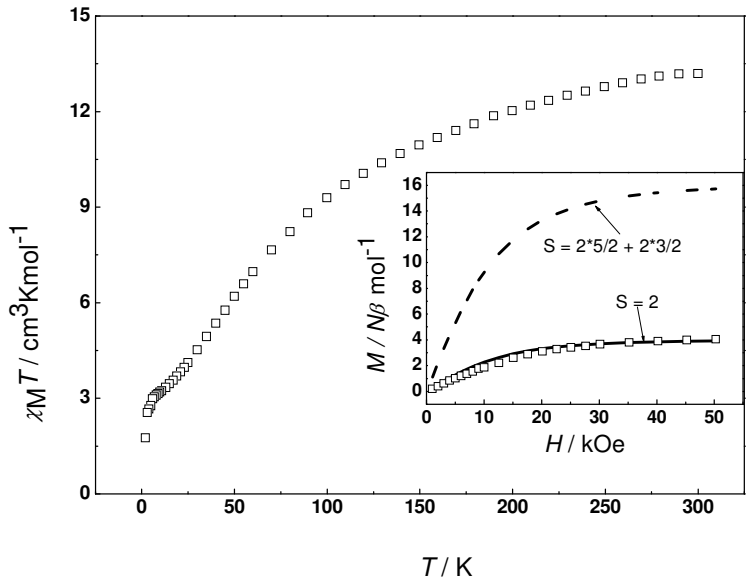

Figure S10 Temperature dependence of the $\chi_M T$ product for **4** at 2 kOe. Solid lines represent the best fits of the data. Inset: Field dependence of magnetization at 2.0 K. The lines represents the Brillouin function that corresponds to $S = 4$ state (solid) and noninteracting $S = 2S_{Cr}^{III} + 2S_{Mn}^{II}$ (break) and with $g = 2.00$.

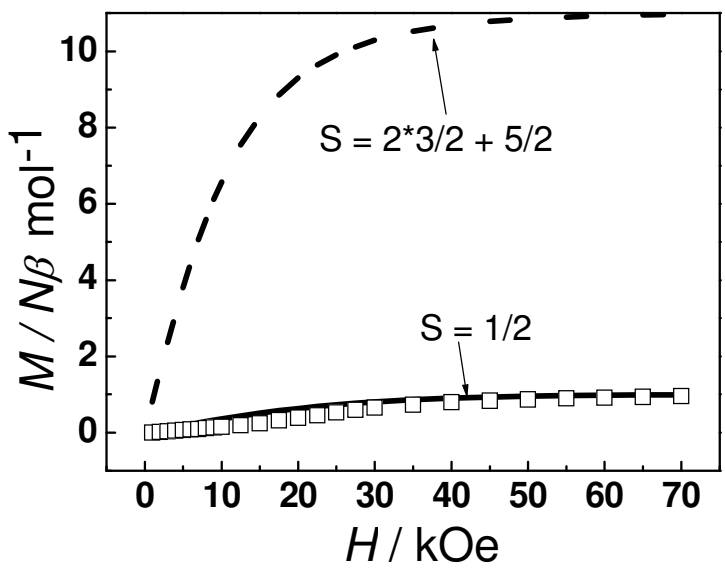

Figure S11 Field dependence of magnetization at 1.8 K for **5**. The lines represents the Brillouin function that corresponds to S = 1/2 state (solid) and noninteracting $S = 2S_{Cr}^{III} + S_{Mn}^{II}$ (break) and with g = 2.00.