Electronic Supplementary Information for Dalton Transactions

Supporting Information

A planar Cu^{2+} (S = ½) kagomé network pillared by 1,2-bis(4-pyridyl)ethane with interesting magnetic properties

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Single crystal X-ray diffraction: Suitable single crystals of compound **1** were mounted on a thin glass fibre with commercially available super glue. X-ray single crystal structural data were collected on a Bruker Smart–CCD diffractometer equipped with a normal focus, 2.4 kW sealed tube X-ray source with graphite monochromated Mo-*Kα* radiation (λ = 0.71073 Å) operating at 50 kV and 30 mA. The programme SAINT was used for integration of diffraction profiles and absorption correction was made with SADABS programme. The structure was solved by SIR 92[1] and refined by full matrix least square method using SHELXL.[2] Non-hydrogen atoms were refined anisotropically and hydrogen atoms were located by Fourier analysis. Selected bond distances, angles and hydrogen bonds are shown in Table S1. The coordinates, anisotropic displacement parameters, and torsion angles for all the compounds are submitted as supplementary information in CIF format. All calculations were carried out using SHELXL 97[2], PLATON 99[3], SHELXS 97[4] and WinGX system, Ver 1.70.01.[5]

[1] A. Altomare, G. Cascarano, C. Giacovazzo, A. Gualaradi, *J. Appl. Cryst*. **1993**, *26*, 343-350.

[2] G. M. Sheldrick, SHELXL 97, Program for the Solution of Crystal Structure, University of Gottingen, Germany, **1997**.

[3] A. L. Spek, PLATON, Molecular Geometry Program, University of Utrecht, The Netherlands, **1999**.

[4] G. M. Sheldrick, SHELXS 97, Program for the Solution of Crystal Structure, University of Gottingen, Germany, **1997**.

[5] L. J. Farrugia, WinGX - A Windows Program for Crystal Structure Analysis. *J. Appl. Crystallogr*. **1999**, *32*, 837-838.

Physical measurements: The elemental analysis was carried out using a Perkin Elmer 2400 CHN analyzer. IR spectrum was recorded on a Bruker IFS 66v/S spectrophotometer using the KBr pellets in the region 4000-400 cm^{-1}. Thermogravimetric analysis (TGA) was carried out on METTLER TOLEDO TGA850 instrument in the temperature range of 25-650 °C under nitrogen atmosphere (flow rate of 50 mL/min) at a heating rate of 5 °C/min. X-ray powder diffraction (PXRD) pattern was recorded on a Bruker D8 Discover instrument using Cu-Kα radiation.

Magnetic Measurements: DC magnetic susceptibility data of powdered crystalline sample of **1** were collected on a Vibrating Sample Magnetometer, PPMS (Physical Property Measurement System, Quantum Design, USA) in the temperature range 2.5 to 300 K with applied field of 100 Oe. Field variation (-5 kOe to 5 kOe) magnetization measurement was carried out at 2.5K.

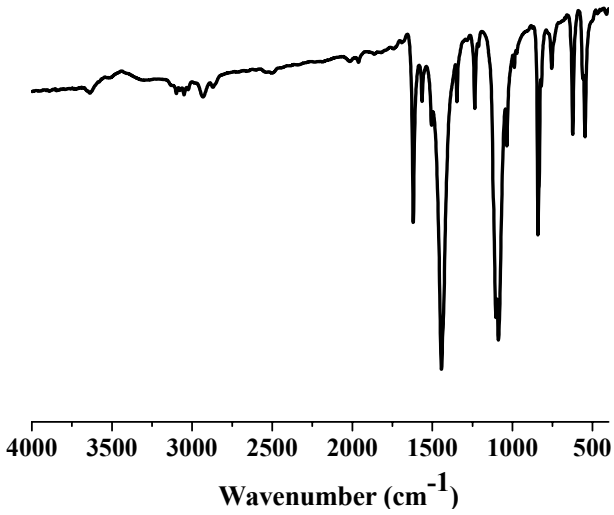

Fig. S1: IR spectrum of crystalline sample of compound **1**.

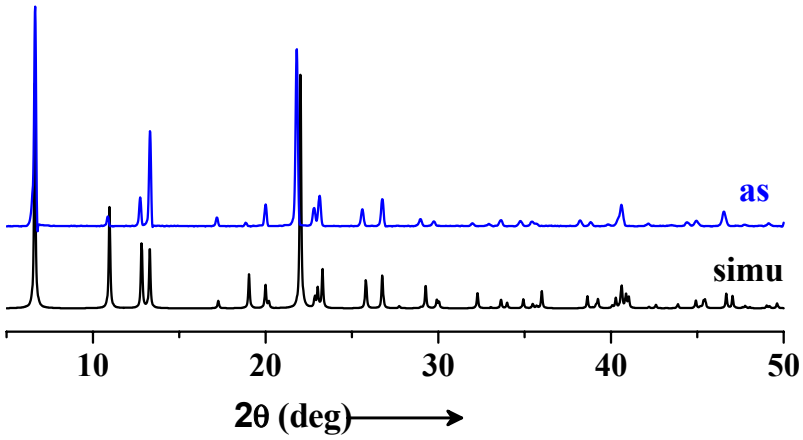

Fig. S2: Powder XRD pattern of compound **1**, simulated (black) and as synthesized (blue), showing that the as synthesized compound have very high phase purity.

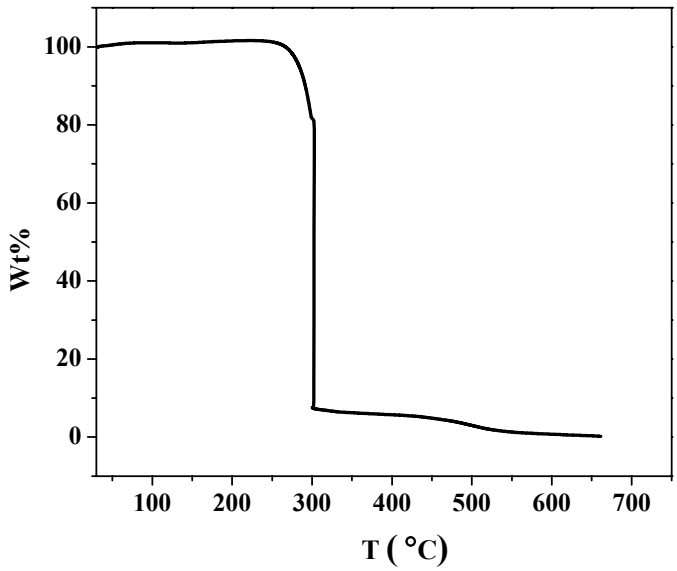

Fig. S3: Thermogravimetric analysis for a crystalline sample of compound **1**, showing that the compound is stable up to 260°C, followed by decomposition of the sample at 302 °C.

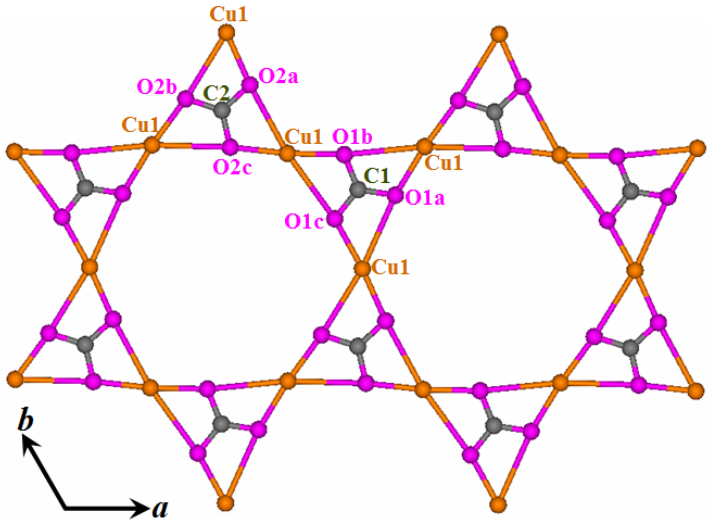

Fig. S4: View of the 2D Kagome layer along crystallographic *c*-direction.

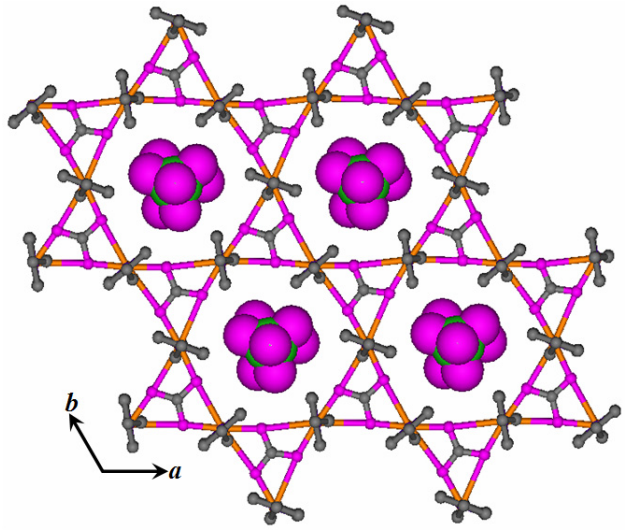

Fig. S5: 3D view of the compound **1** showing that hexagonal channels are occupied by perchlorate anions (CPK view).

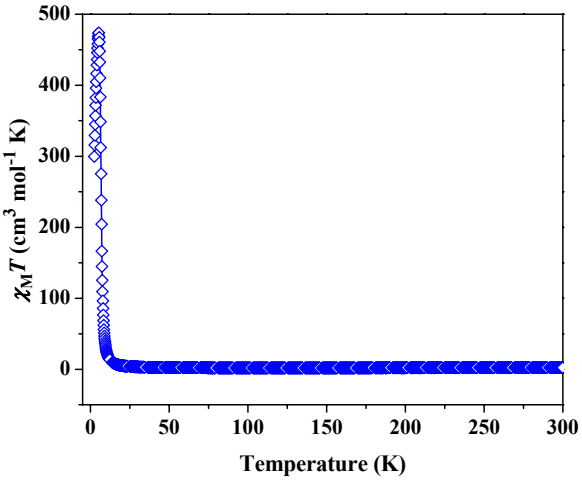

Fig. S6: Temperature dependence of $\chi_M T$ for **1** showing a net onset of ferromagnetic coupling down to 12 K.

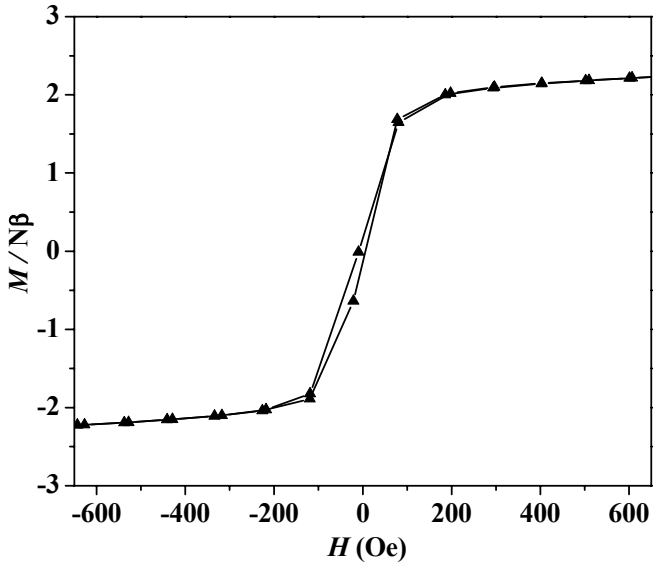

Fig. S7: View of Magnetic hysteresis loop for **1** at 2.5 K shows a coercive field of 8.5 Oe suggesting **1** behaves as a soft magnet.

Table S1: Selected bond lengths and bond angles of compound 1

Cu1-O1	1.949(4)	Cu1-O2	1.959(4)
Cu1-N3	1.987(3)	Cu1-O2_k	2.669(5)
Cu1-O1_l	2.763(5)	Cu1-N3_o	1.987(3)
O1-Cu1-O2	175.1(2)	O1-Cu1-N3	90.16(10)
O1-Cu1-O2_k	119.6(2)	O1-Cu1-O1_l	53.0(2)
O1-Cu1-N3_o	90.16(10)	O2-Cu1-N3	89.94(10)
O2-Cu1-O2_k	55.5(2)	O1_l-Cu1-O2	131.9(2)
O2-Cu1-N3_o	89.94(10)	O2_k-Cu1-N3	90.87(10)
Cu1-O1-Cu1_n	73.0(3)	O1_l-Cu1-N3	89.23(10)
N3-Cu1-N3_o	177.80(17)	O1_l-Cu1-O2_k	172.6(2)
Cu1-O2-Cu1_m	175.5(3)	O2_k Cu1-N3_o	90.87(10)
O1_l-Cu1-N3_o	89.23(10)		

Symmetry codes: k = -x+y, -x, -z; l = -x+y, 1-x, -z; m = -y, x-y, z; n = 1-y, 1+x-y, z; o = x, y, -z