Electronic Supplementary Information

An octanuclear $\{Cu^{II}_4Dy^{III}_4\}_2]$·coordination cluster showing Single Molecule Magnet behavior from field accessible states

Irina A. Kühne,[a] Nicola Magnani,[b] Valeriu Mereacre,[a] Wolfgang Wernsdorfer,[c] Christopher E. Anson,[a] Annie K. Powell[a,b,]*

[a)] *Institute of Inorganic Chemistry, Karlsruhe Institute of Technology, Engesser Str. 15, D-76131, Karlsruhe, Germany.*
[b)] *Institute of Nanotechnology, Karlsruhe Institute of Technology, Postfach 3640, D-76021, Karlsruhe, Germany.*
[c)] *Institut Néel, CNRS, Nanoscience Department, BP 166, 380412 Grenoble Cedex 9, France.*
** Fax: (+49) 721-608-8142 E-mail: powell@aoc.uni-karlsruhe.de*

(3 pages, 4 figures)

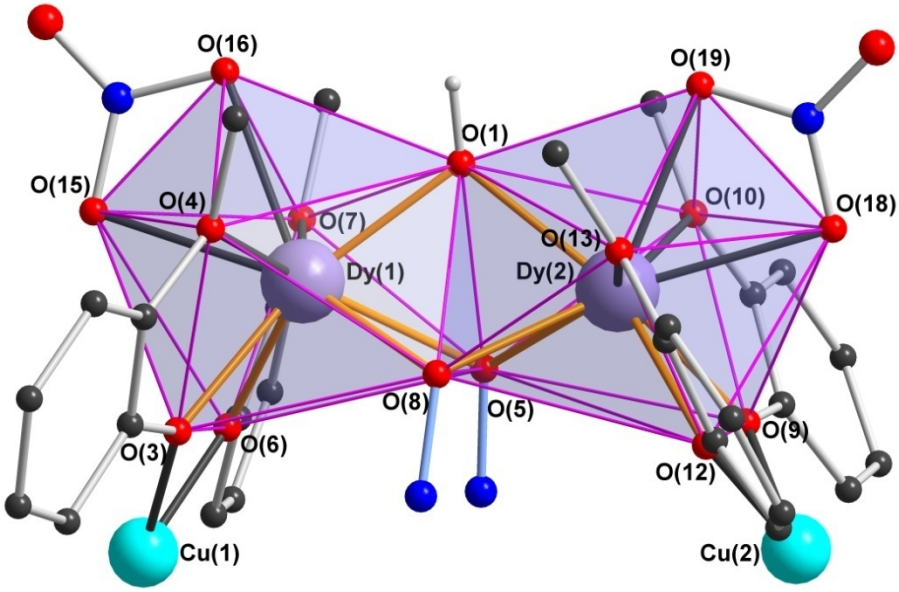

Figure S1. The Dy^{III} coordination polyhedra in the Dy(1)-Dy(2) unit of $[Cu^{II}_4Dy^{III}_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}HOMe)_2]\cdot 6MeOH$ **1**.

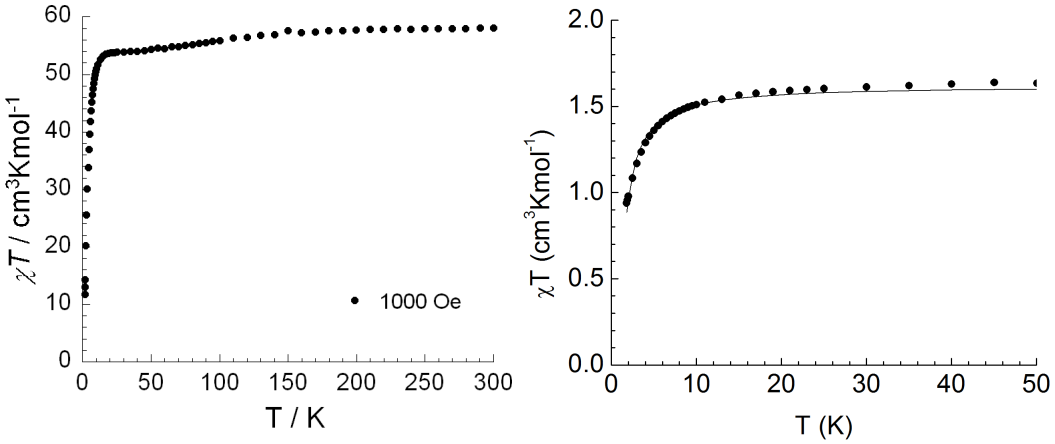

Figure S2. dc magnetic susceptibility measurements for $[Cu^{II}_4Dy^{III}_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}HOMe)_2]\cdot 6MeOH$ **1** (left) and $[Cu_4Y_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}OH_2)_{1.6}(\mu\text{-}HOMe)_{0.4}]\cdot 6MeOH$ **2** (right). The solid line plotted in the right panel is the best fit obtained considering two isolated Cu dimers, with g_{Cu} = 2.08 and J_3 = -1.32 (see main text for details).

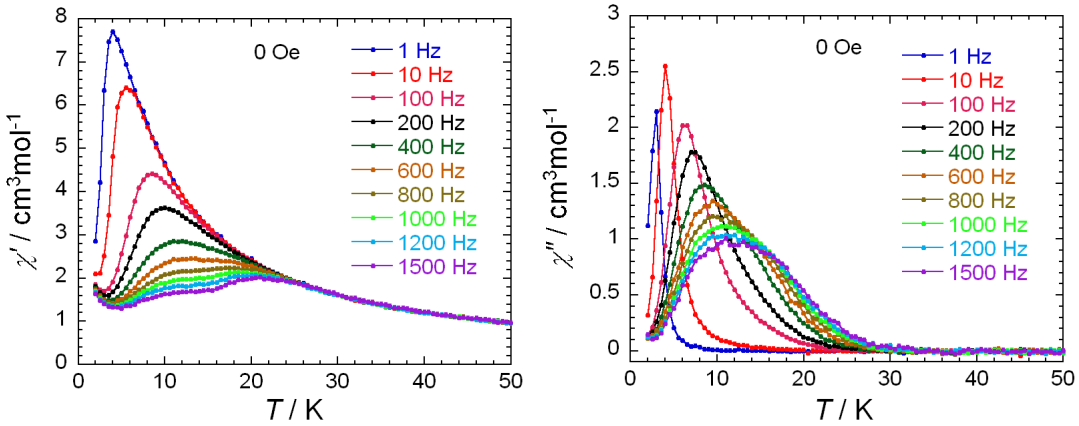

Figure S3. In-phase (left) and out-of-phase (right) ac magnetic susceptibility signal measured for $[Cu^{II}_4Dy^{III}_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}HOMe)_2]\cdot 6MeOH$ **1** as a function of temperature and frequency.

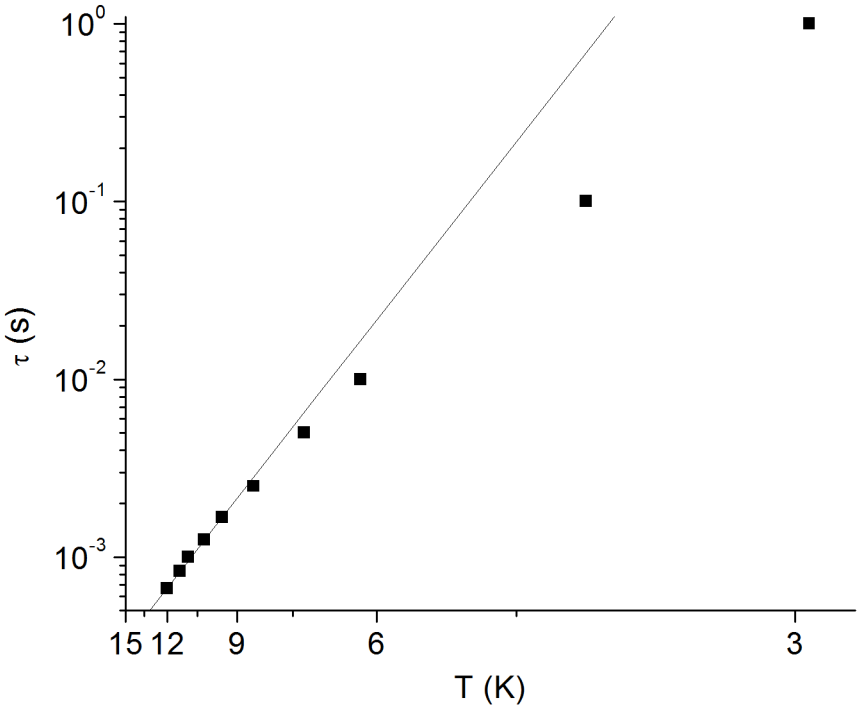

Figure S4. Relaxation time τ for $[Cu^{II}_4Dy^{III}_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}HOMe)_2]\cdot 6MeOH$ **1**as a function of temperature T.

Synthetic details:

Reaction of $CuBr_2$, $Dy(NO_3)_3{\cdot}6H_2O$, H_2vanox (3-methoxy-2-hydroxybenzaldoxime) and triethylamine in methanol resulted in $[Cu^{II}_4Dy^{III}_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}HOMe)_2]\cdot 6MeOH$ as dark green crystals in 13.3 % yield. Calc. for $C_{62}H_{64}Cu_4Dy_4N_{12}O_{40}$ (replacement of bridging MeOH with aqua ligands, and replacement of lattice MeOH by $9H_2O$): C 27.56, H 3.13, N 6.22; found C 27.66, H 2.96, N 5.93 %.

A similar reaction with $Y(NO_3)_3{\cdot}6H_2O$ gave the corresponding $[Cu_4Y_4(vanox)_6(Hvanox)_2(NO_3)_4(\mu\text{-}OH_2)_{1.6}(\mu\text{-}HOMe)_{0.4}]\cdot 6MeOH$ compound in 24.8 % yield. Calc. for $C_{64}H_{58}Cu_4Dy_4N_{12}O_{43}$ (replacement of lattice MeOH by $6H_2O$): C 33.12, H 3.35, N 7.13; found C 33.09, H 3.42, N 7.19 %