Minor changes in phosphonate ligands lead to new hexa- and
dodeca-nuclear Mn clusters

Maheswaran Shanmugam,* Muralidharan Shanmugam,∗ Guillaume Chastanet, Roberta Sessoli, Talal Mallah, Wolfgang Wernsdorfer and Richard E. P. Winpenny*

School of Chemistry, University of Manchester, Oxford Road, Manchester, M13 9PL, UK. Fax: (+44) 161-275-4616; E-mail: richard.winpenny@manchester.ac.uk
Laboratorio di Magnetismo Molecolare, Dipartimento di Chimica, Universita degli Studi di Firenze & INSTM, Via della Lastruccia n. 3, 50019 Sesto Fiorentino, Italy.
Laboratoire Louis Neel- CNRS, BP 166, 25 Avenue des Martyrs, 38042 GRENOBLE, Cedex 9, France.

Magnetization performed on powder samples of 3 is shown below, which shows a sharp increase at low field and approaches saturation at 12 µB. Upon increasing the field above 3.5 T the magnetic moment starts to increase again which shows that excited state levels are very close to that of a ground state $S = 6$.

Fig. S1 Magnetization Vs Field measurement of 3 recorded at 2-3 K.
AC measurement performed on polycrystalline powder samples of 3. The in phase and out of phase magnetic susceptibility at various frequencies (700 Hz – 20 kHz) is shown below.

**Fig. S2** Temperature-dependence of the in phase (left) and out-of-phase (right) susceptibility of 3 measured from 700 Hz to 20 kHz.

**Fig. S3.** Magnetization vs DC field plots for a single crystal of complex 3 at the indicated temperatures and a fixed field-sweep rate of 0.035 T/s