## **Electronic Supplementary Information (ESI)**

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

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Magnetization performed on powder samples of **3** is shown below, which shows a sharp increase at low field and approaches saturation at 12  $\mu_B$ . 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