Supporting Information

A series of 1D Dy(III) compound showing slow magnetic relaxation: synthesis, structure, and magnetic studies

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IR Studies.

The IR spectrum of these compounds is investigated in KBr pellets. For **1**, the IR bonds of 3100 cm^{-1} is ascribed to the C-H stretching bond of L1 phenyl ring. 3353 cm^{-1} indicates that the water molecules afford H-bonds. The absence of IR bonds around 1700 cm^{-1} implies that in **1** all the L1 ligand is deprotonated. And the typical antisymmetric (1642 cm^{-1}) and symmetric (1596, 1517 cm^{-1}) stretching bands with respective values of $\Delta=v_a(coo^-)-v_s(coo^-)$ clearly indicate the presence of chelate (46 cm^{-1}), bidentate (125 cm^{-1}) coordination modes of the carboxyl groups. [1] 1508 cm^{-1} is a typical IR bonds of $-NO_2$ group. The 1,4- substituent of L1 ligand is manifested by 875 cm^{-1} IR bond. Similarly, for **2** and **3**, the typical IR bonds of phenyl ring are around 3085 cm^{-1}, 3067 cm^{-1}. The H-bonds from water molecule are also observed, as evidenced by IR bonds of 3478 cm^{-1} for **2** and 3340 cm^{-1} for **3**. The above-discussed coordination mode of carboxyl groups are also confirmed by IR spectrum: for **2**, chelate and bidentate coordination mode can be deduced from the typical antisymmetric (1659 cm^{-1}) and symmetric (1605, 1530 cm^{-1}) stretching bands with respective values of Δ=54, 129 cm^{-1}, whereas for **3**, 1698 cm^{-1} approves monodentate coordinated mode and the corresponding IR bonds of 1617, 1555, 1487, 1421 cm^{-1} with Δ=62, 130, 196 cm^{-1} suggest chelate, bidentate, and monodentate coordinated mode. The typical IR bonds of $-NO_2$ group is 1510 cm^{-1} for **2** and 1512 cm^{-1} for **3**. As observed in **1**, the IR bond of 1,4-substituent of L1 ligand in **3** is about 875 cm^{-1}. By contrast, the IR bond of 1,3-substituent of L2 ligand in **2** is around 783 cm^{-1}, 720 cm^{-1}.

1 M. Kakihana, T. Nagumo, M. Okamoto, H. Kakihana. *J. Phys. Chem.*, 1987, **6128**, 91.

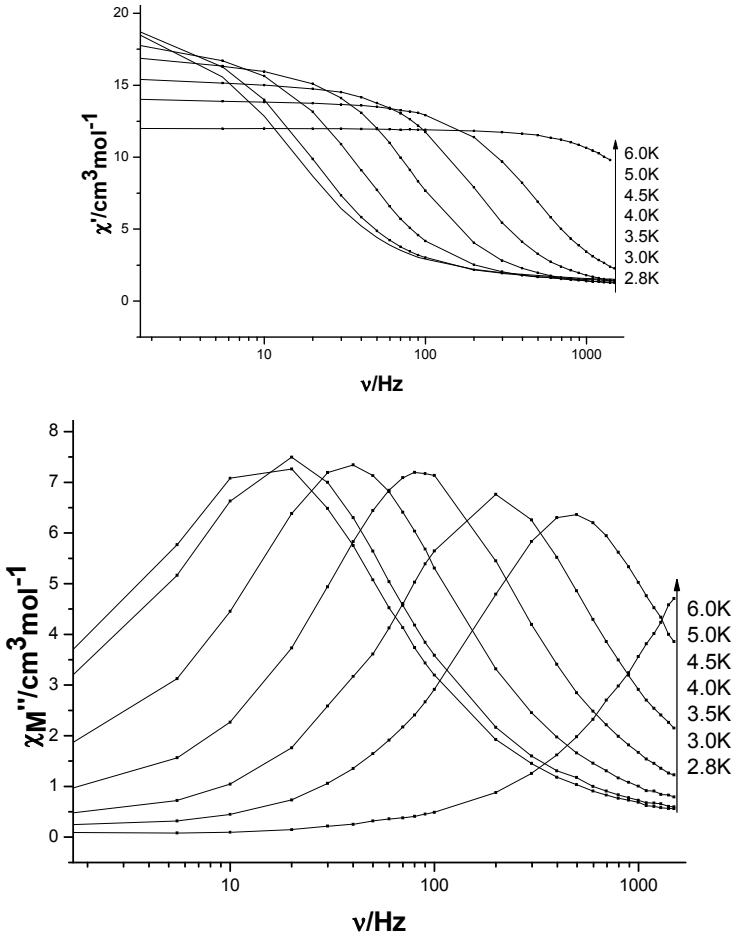

Fig. S1 The frequency dependent ac susceptibility data under dc=1000 Oe, ac=3 Oe.

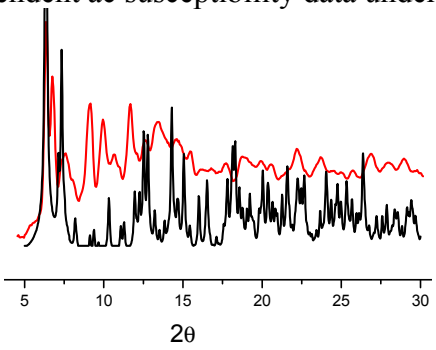

Fig. S2 The experimental/red XRD pattern of bulk samepls and simulated/black XRD pattern from singel crystal data of **2**.

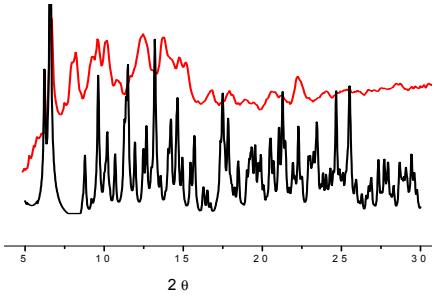

Fig. S3 The experimental/red XRD pattern of bulk samepls and simulated/black XRD pattern from singel crystal data of **3**.