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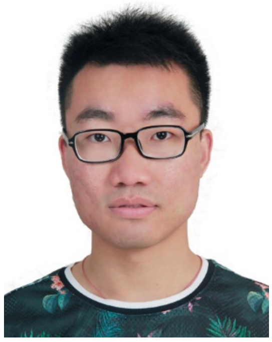

Diplomas

2009: B. Sc., Sun Yat-Sen University, Guangzhou, P. R. China
2014: Ph.D. Sc., Sun Yat-Sen University, Guangzhou, P. R. China

Career summary

2014-2015: Lecturer, Northwest University, P. R. China
2015-2018: Research Fellow, The University of Manchester, United Kingdom
2018-present: Research Fellow, The University of Sussex, United Kingdom

Selected publications:

1. "*Isolation of a Perfectly Linear Uranium(II) Metallocene*", F.-S. Guo et al., *Angew. Chem. Int. Ed.*, **2020**, DOI: 10.1002/anie.201912663.
2. "*Uranocenium: Synthesis, Structure and Chemical Bonding*", F.-S. Guo et al., *Angew. Chem. Int. Ed.*, **2019**, *58*, 10163.
3. "*Main Group Chemistry at the Interface with Molecular Magnetism*", F.-S. Guo et al., *Chem. Rev.*, **2019**, *119*, 8479
4. "*Magnetic hysteresis up to 80 kelvin in a dysprosium metallocene single-molecule magnet*", F.-S. Guo et al., *Science*, **2018**, *362*, 1400.
5. "*A dysprosium metallocene single-molecule magnet functioning at the axial limit*", F.-S. Guo et al., *Angew. Chem. Int. Ed.*, **2017**, *56*, 11445.
6. "*Strong direct exchange coupling and single-molecule magnetism in indigo-bridged lanthanide dimers*", F.-S. Guo et al., *Chem. Comm.*, **2017**, *53*, 3130.
7. "*Anion-Templated Assembly and Magnetocaloric Properties of a Nanoscale {Gd_{38}} Cage versus a {Gd_{48}} Barrel*", R. Ohtani, M. Ohba, S. Kitagawa et al., *Chem. Eur. J.*, **2013**, *19*, 14876.
8. "*A large cryogenic magnetocaloric effect exhibited at low field by a 3D ferromagnetically coupled Mn(II)–Gd(III) framework material*", F.-S. Guo et al., *Chem. Comm.*, **2012**, *48*, 12219.
9. "*Polynuclear and Polymeric Gadolinium Acetate Derivates with Large Magnetocaloric Effect*", F.-S. Guo et al., *Inorg. Chem.*, **2012**, *51*, 405.

Magnetic Hysteresis above 77 K in a Dysprosium Metallocene Single-Molecule Magnet

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Single-molecule magnets (SMMs) containing only one metal center are a type of nanomagnet that may represent the lower size limit for molecule-based magnetic information storage materials.[1-2] The current drawback is that all SMMs require liquid-helium cooling to show magnetic memory effects. We now show that a strategy in which two key structural parameters within the metallocene framework – i.e. the Dy-Cp_{cent} distances and the Cp-Dy-Cp bending angle – are rendered short and wide, respectively, through a careful choice of ligand substituent produces an axial crystal field of sufficient strength to furnish the first SMM with a blocking temperature above 77 K.

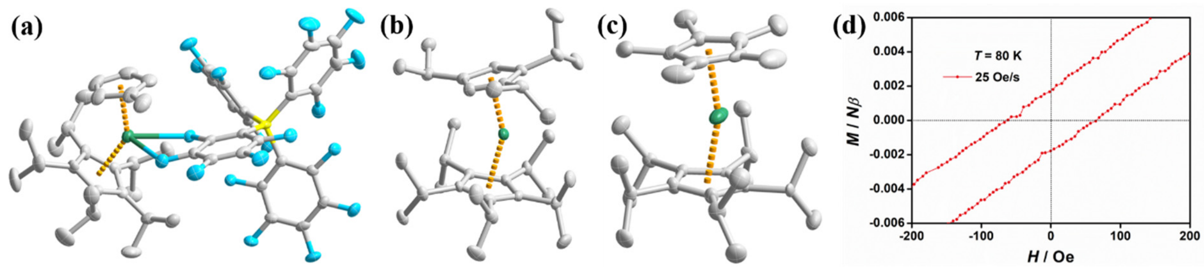

Figure 1. (a-c) Structures of the dysprosium metallocene complexes. (d) Magnetic hysteresis of the "5*" cation at 80 K with a sweep rate of 25 Oe/s.

A dysprosium metallocene cation, $[(Cp^{iPr5})Dy(Cp^{*})]^{+}$ ("5*" cation, see Figure 1c), was targeted with cyclopentadienyl substituents of sufficient bulk to produce a wide Cp-Dy-Cp angle, but not too bulky such that close approach of the ligands became hindered. A new record energy barrier of U_{eff} = 1,541 cm^{-1} is described. The blocking temperature of T_B = 80 K for the 5* cation ushers in an era of high-temperature SMMs, thus overcoming an essential barrier towards the development of nanomagnet devices that function at practical temperatures.[3]

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