Anisotropic Heptacoordinate Transition–Metal Complexes: Single-Ion-Magnets and Ising–Type Building Units.

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The energy barrier for magnetization reversal of a molecular magnet (i.e. SMM or SCM) is intimately related to the zero-field splitting characteristics (*D*) of its individual building units. However, it is still challenging for chemists to control the magnetic anisotropy of the complexes involved in the construction of such molecular magnets. We will discuss our approach using heptacoordinates 3d metal with pentagonal bipyramid geometry. With appropriate metal ions (Fe^{II}, Ni^{II}, Co^{II}), these complexes exhibit significant anisotropy with *D* parameters spanning from -20 to 40 cm^{-1} [1] and may even exhibit slow magnetic relaxation (Figure).[2] We will show that their structural robustness allows involving them as building units for the construction of polynuclear molecular magnets.[3]

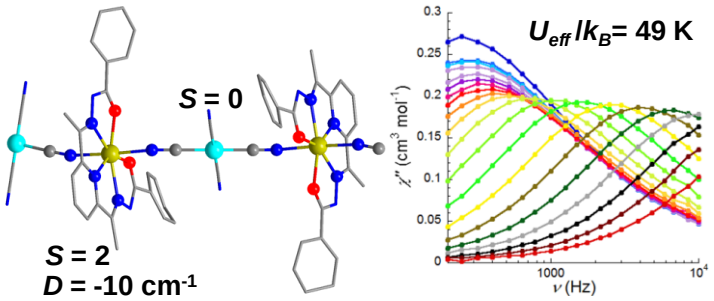

Figure : Solid state organization and out-of-phase magnetic susceptibility feature for a Fe(II) center in D_{5h} surrounding.

REFERENCES

[1] *Coord. Chem. Rev.* **2016**, *308(2)*, 346; *Chem. Eur. J.* **2013**, *19*, 950
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[3] *Chem. Eur. J.* **2017,** *23*, 4380; *Inorg. Chem.*, **2013**, *52*, 2283. *J. Am. Chem. Soc.,* **2010**, *132*, 6047