

CORE-CM SEMINAR

Michigan State University

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Lanthanide-Based Single-Molecule Magnets

Single-molecule magnets have intriguing potential applications in areas such as magnetic refrigeration, molecular spintronics and high-density information storage. To realize these potential, both spin relaxation barriers and high blocking temperatures need to increase. Owing to their large magnetic moments and magnetic anisotropy as a result of the near degeneracy of the strongly spin-orbit coupled 4f orbitals, lanthanides have been demonstrated to be well-suited for the design of single-molecule magnets. In particular, employing lanthanide ions such as Tb³⁺ and Dy³⁺ which possess intrinsically large orbital angular momentum, high spin relaxation barriers can be attained. High barriers, however, do not always result in high blocking temperatures owing to insufficient suppression of quantum tunnelling of the magnetization. Thus, a particularly promising route to yield high blocking temperatures is to increase the magnetic exchange coupling by using an organic radical ligand to bridge two lanthanide ions. A number of record single molecule magnets have been produced through this strategy. Herein, the remarkable magnetic properties of several lanthanide complexes involving various radical bridging ligands will be presented.

Thursday, September 7, 2017

12:00 NOON

Room 1400 – Biomedical & Physical Sciences

Professor James McCusker - Host