Magnetic molecules: their perspectives as qubits, magnetoelectric and magnetocaloric materials

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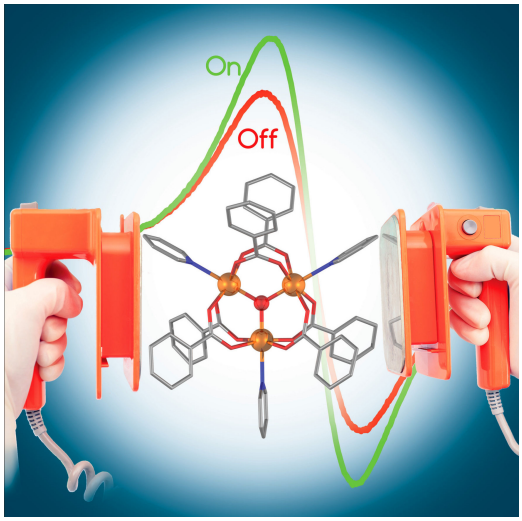
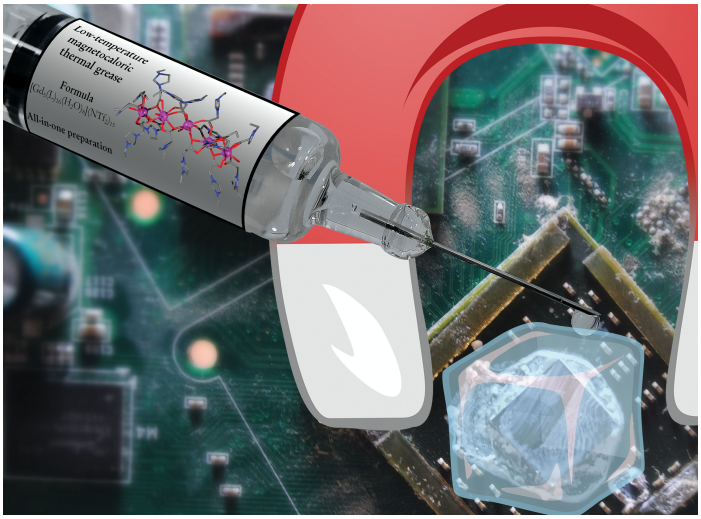
A magnetic molecule is one containing unpaired electrons. These electrons can reside on metal ions, organic radical sites, or both; they can be fully localized or entirely delocalized. What distinguishes these magnetic molecules from "classical" magnetic materials (metals, metal oxides etc) is a direct consequence of their molecular nature. Chemically, these molecules can be synthetically tailored to specific characteristics. Physically, they can exhibit magnetism in one, two or three dimensions, like their classical counterparts, in which case we may call them "molecular magnets". But they can also exhibit zero-dimensional magnetism, i.e. at the level of an isolated "magnetic molecule". And this can be in the solid state, in solution, as Ionic Liquids, or on surfaces.

This talk will present a brief outline of some of the new uses these magnetic molecules are hopeful in achieving. They can be used as qubits, storing information on their spin state.[1,2] They can be used as magnetoelectric materials, having their magnetic properties controlled by electric fields.[3,4] They can be used in magnetic refrigeration, using their magnetic entropy changes for cooling applications.[5] And in each case, they can be formulated not just as solids or solutions, but also as Ionic Liquids.





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