

Rational Design of Magnetic Materials Based on "Single-Molecule Magnet" Building-Blocks

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In the last ten years, considerable research effort has been devoted to the synthesis of nanometer scale magnetic systems with the ultimate goal to reduce the size of the magnetic units that store information. Different approaches have been used to obtain single-domain magnetic particles, but the beginning of the 1990's marked the discovery of Single-Molecule Magnets (SMMs)[1a] creating the hope to store information on a molecule [1b]. In the 19 years since, numerous SMMs have been discovered and a broad community currently works on new systems with improved magnetic characteristics. However, it has also become an important strategy to diversify a part of our research toward the organization of these nanomagnets in order to progress towards future applications. A few strategies have been recently proposed such as the organization of SMMs on surfaces [2], their insertion in mesoporous materials[3] or also their association by coordination chemistry [4]. Since 2001, we have actively participated in the last two approaches and obtained significant results [4]. Our idea to organize SMMs in coordination networks has been one of the most successful strategy and has lead to the discovery of new magnetic behaviors [4]. In this lecture, we will describe new magnetic materials based on SMM building-blocks that display fascinating magnetic properties such as Single-Chain Magnets.

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