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Molecular nanomagnets for information technologies MARCO AFFRONTE, CNR-INFM-S3 — I have recently reviewed challenges, achievents and perspectives in the field of molecular magnets in a review article in J. of Mat. Ch. DOI: 10.1039/b809251f (2008) focusing on quantum information. Molecular magnets are indeed quantum objects, with well-defined spin states at low temperature. The challenge is to obtain scalable quantum hardware with long coherence time. A paradimatic case is that of AF rings in which an extra spin was introduced to have a S=1/2 as ground state (Phys. Rev. Lett. 94, 190501 (2005) and use excited states as a resource for implementing two-qubit gates (Phys. Rev. Lett. 94, 190501 (2005), Phys. Rev. B 76, 024408 (2007). The mechanism of decoherence can be studied in details by considering hyperfine interactions with finite number of nuclear spins(Physical Review B 77, 054428 (2008). Cr7Ni are stable in solution, can be functionalized to be grafted on surface (Inor. Chem. 46, 4968-4978 (2007) or to be linked each other by forming supramolecular complexes (Angew. Chem Int. Ed. 44, 6496 (2005) and Nature Nanotechnology 2008) with tuneable entanglement of spin states.

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