

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Visualizing Improved Spin Coupling in Large Magnetic Molecules

JUDITH DONNER, Institute for Molecules and Materials, Radboud University Nijmegen, JAN-PHILIPP BROSCINSKI, BASTIAN FELDSCHER, THORSTEN GLASER, Faculty of Chemistry, University of Bielefeld, ALEXANDER AKO KHAJETOORIANS, DANIEL WEGNER, Institute for Molecules and Materials, Radboud University Nijmegen — In an attempt to combine a high spin ground state and a large magnetic anisotropy in one molecule, triplesalen-based complexes are promising building blocks for a new generation of single molecule magnets (SMMs). The spin coupling in these molecules is based on the spin polarization effect, which requires a delocalized aromatic π -system in the central carbon ring of the complex. Unfortunately, chemical analysis indicates that this ring can change its configuration to [6]radialene, therefore causing a loss of aromaticity and weakening the magnetic coupling. We have employed a combination of scanning tunneling microscopy (STM) and spectroscopy (STS) to investigate single Cu₃-triplesalen and Cu₃-triplesalalen molecules, the latter being designed to show an enhanced intramolecular spin coupling. The large molecules were deposited in situ using the unconventional techniques pulse injection and rapid heating. A thorough structural and spectroscopic analysis allows us to discuss the electronic properties of the two complexes, with a special focus on the state of the central carbon ring. We find that even small changes in the ligand structure have a drastic influence on the intramolecular spin coupling, which opens the way for an improved rational design of future SMMs.

Judith Donner
Institute for Molecules and Materials, Radboud University Nijmegen

Date submitted: 05 Nov 2015

Electronic form version 1.4