

Ausschreibung Master Arbeit (Deutsch oder Englisch)

Study of physico-chemical properties of organic molecules on thin magnetic films

Single molecule magnets (SMM's) are nanometer-sized magnetic materials exhibiting not only classical macroscale properties, but also fascinating quantum effects. Therefore understanding the mechanisms of spin transport at the interfaces between metallic electrodes and organic molecular layers is of the great importance for future technological applications. The systems under study are organic molecules containing a magnetic metal center, adsorbed on thin magnetic films. An example, being investigated now, is manganese (III) tetraphenyl - porphyrin chloride (MnTPPCl) (Figure 1 A).

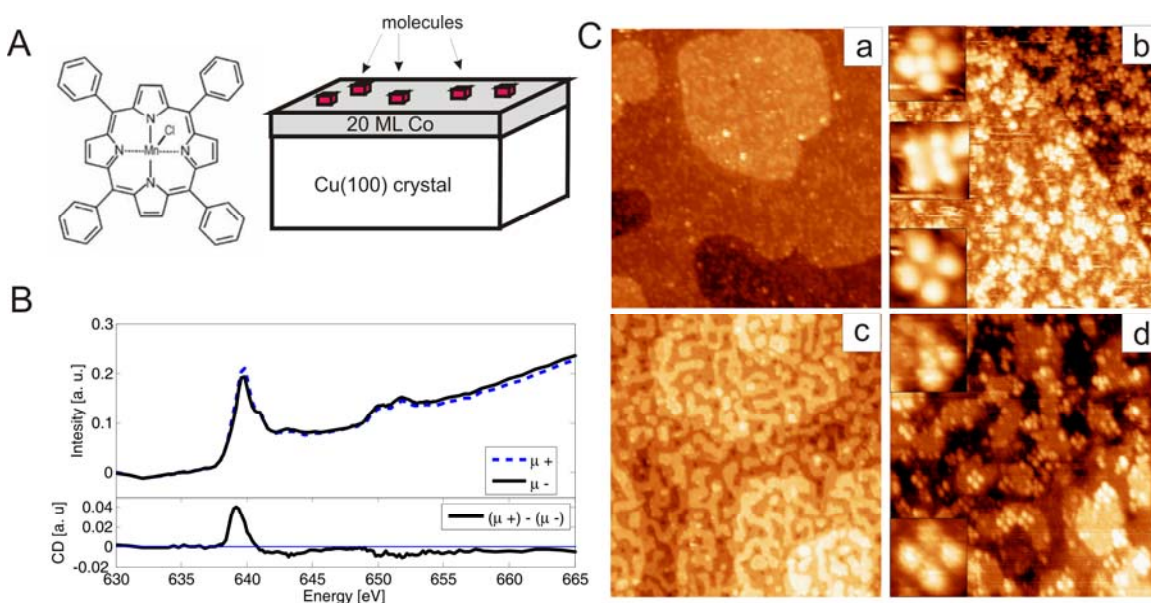


Figure 1 A: schematic picture of MnTPPCl molecule, and of the 20 ML (monolayers) of Co on top of Cu(100) single crystal, used as a substrate; **B:** XAS and XMCD spectra of Mn L edge, exhibiting a dichroic signal; **C:** STM images of flat (a) and rough (c) Co surfaces, and of MnTPPCl molecules on both substrates (b and d, respectively).

This molecule couples magnetically to Co substrate (Figure 1 B). In order to employ it to further applications, the origin of the coupling and details about adsorption must be known. Several methods, like: photoelectron spectroscopy (XPS and UPS), or scanning tunnelling microscopy (STM) (Figure 1 C) have been employed to achieve this aim.

The project tasks will include analysis of the samples using the above mentioned methods, as well as examining them, with respect to the coverage, sort of molecules used and different substrates' types (flat/rough), by means of synchrotron measurements (X-ray Magnetic Circular Dichroism).

Starting date: Anytime in 2011

Contact: Thomas Jung (thomas.jung@unibas.ch), 056 310 4518
061 267 3911

Christian Waeckerlin (christian.waeckerlin@psi.ch), 056 310 5244