TECHNISCHE UNIVERSITÄT CHEMNITZ

PHYSIKALISCHES KOLLOQUIUM

Mittwoch, 12.06.2013, um **17:15 Uhr**

Ort: Reichenhainer Str. 90; Neues Hörsaalgebäude, Raum: 2/N013

Prof. Dr. Heiko Wende

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Spin-hybrid systems constructed from metalorganic molecules: from FePc single-deckers to $DyPc_2$ double-deckers

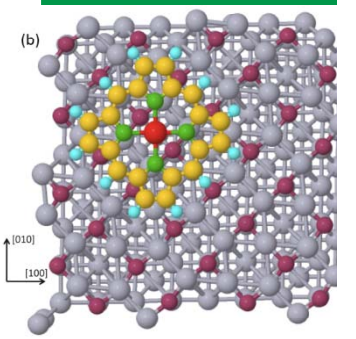

Fig. 1: *Relaxed structure of Fe-porphyrin molecule adsorbed on oxygen reconstructed Cu(100) surface ($(\sqrt{2}\times 2\sqrt{2})R45^\circ$ O/Cu(100).*

In the on-going process of electronic device miniaturization new concepts are developed as e.g. molecular spintronics. For these devices magnetic molecules are discussed as possible building blocks. However, single molecular magnet systems exhibit their fascinating magnetic effects like quantum tunnelling in the temperature regime of a few 100 mK making the use of these magnetic properties in room temperature spintronic devices unlikely [1]. Therefore, we pursue a different approach here by magnetically coupling paramagnetic molecules to ferromagnetic surfaces [2]. By means of temperature-dependent X-ray absorption spectroscopy and especially X-ray magnetic circular dichroism as well as X-ray natural linear dichroism we are able to analyze the magnetism and the electronic structure element specifically. We can identify a relatively strong magnetic coupling between Fe-porphyrin (FeP) and Fe-phthalocyanine (FePc) molecules to the ferromagnetic substrates formed by epitaxially grown Co and Ni films on Cu(100). This ferromagnetic coupling leads to an ordering of the spins of the metalorganic FeP and FePc molecules at room temperature [2]. The coupling can be tailored towards an antiferromagnetic one for both molecular systems by modification of the molecule/substrate interface using an intermediate layer of atomic oxygen [3]. The magnetic anisotropy of the metalorganic molecules is studied on non-magnetic substrates. Examples will be presented for Fe-porphyrin molecules on Cu(001) with and without an intermediate layer of atomic oxygen. By comparing the experimental results to state-of-the art DFT calculations (Fig. 1) a solid interpretation of the relevant magnetic interactions is achieved. To gain insight into the differences for organic molecules with 3d and 4f metallic centers low temperature XMCD studies of $DyPc_2$ molecules on HOPG will be presented. Furthermore, the prospect of switching the spin-state of porphyrin molecules by structurally distorting the molecules adsorbed on graphene will be discussed [4].

Alle Zuhörer sind ab 17:00 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt Prof. Dr. Thomas Seyller, Tel.: 0371 531 32898