Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Coupling TbPc2 single molecule magnets to antiferromagnetic FeMn layers CORNELIU NISTOR, ETH, Dept Mat, CH-8093 Zurich, Switzerland, CORNELIUS KRULL, AITOR MUGARZA, Catalan Institute of Nanotechnology, E-08193 Barcelona, Spain, CHRISTIAN STAMM, ETH, Dept Mat, CH-8093 Zurich, Switzerland, SVETLANA KLYATSKAYA, MARIO RUBEN, KIT, Inst Nanotechnol, D-76344 Eggenstein Leopoldshafen, Germany, MARCIO SOARES, ESRF, F-38043 Grenoble, France, SEBASTIAN STEPANOW, PIETRO GAMBARDELLA, ETH, Dept Mat, CH-8093 Zurich, Switzerland — Coupling of single molecule magnets to magnetically ordered (ferromagnetic or antiferromagnetic) layers is a novel research field that has potential applications in molecular-scale spintronic devices. In this study we explore the possibility to magnetically couple TbPc2 molecules to FeMn layers deposited on a Cu (100) substrate. Using X-ray magnetic circular dichroism we demonstrate that, following field cooling, the out-of-plane Tb magnetization loop is vertically shifted and, furthermore, the Tb and Fe magnetization are antiferromagnetically coupled. Additionally, it is found that the Fe magnetization loop is vertically shifted and that this vertical shift depends on the elemental composition of the FeMn layer. The hysteretic behavior of the Tb magnetization together with the horizontal shift of the Tb loop are consistent with the hypothesis that a fraction of the TbPc2 molecules are coupled to the uncompensated Fe spins through a ligand-mediated superexchange mechanism.

Corneliu Nistor
ETH, Dept Mat, CH-8093 Zurich, Switzerland

Date submitted: 14 Nov 2013 Electronic form version 1.4