

Experiment HE 3739 ID08 ESRF October 2012

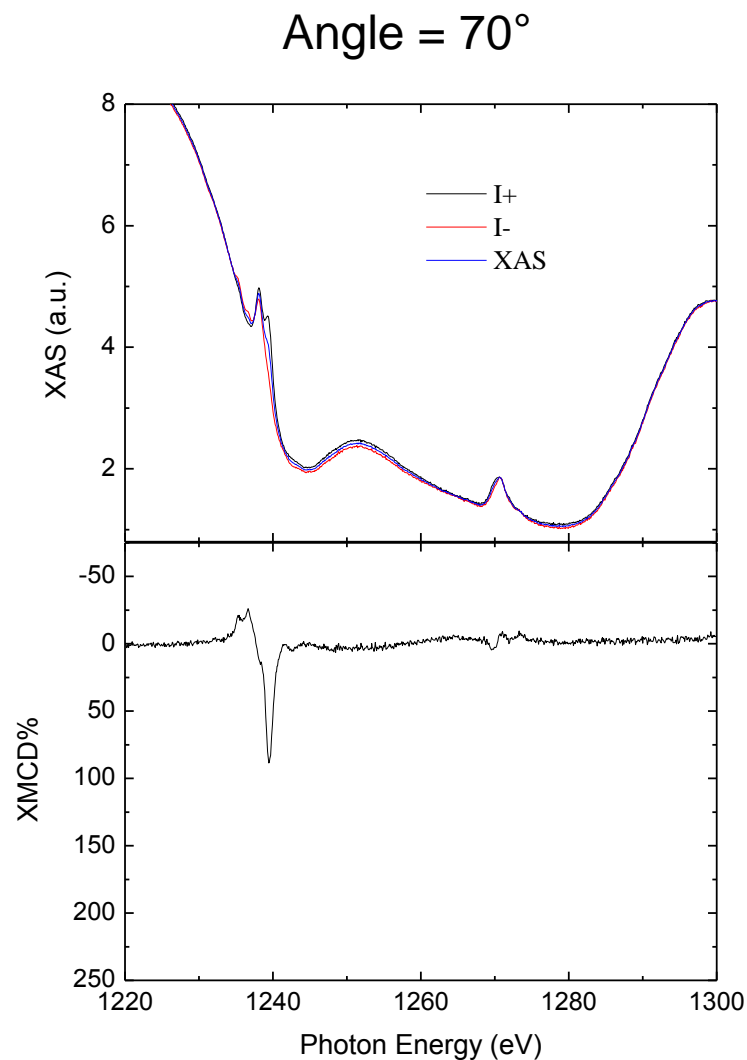
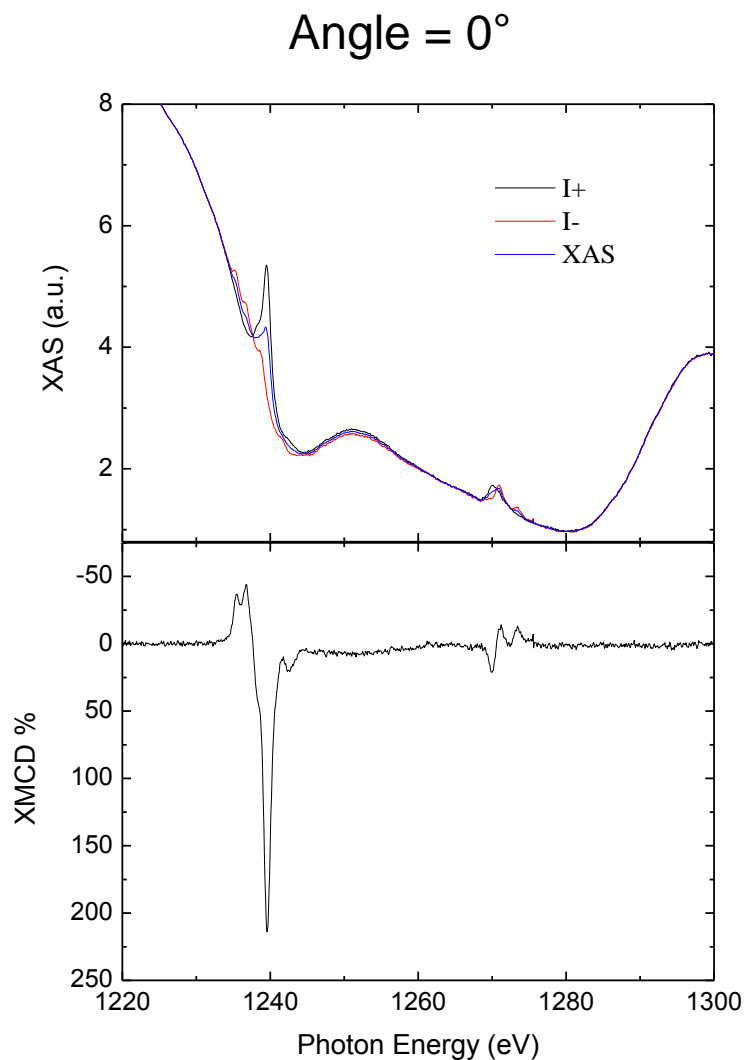
SUMMARY REPORT

We measured XAS XMCD and XNLD on submonolayer of TbPc₂ molecules evaporated on three different substrates: Ni(111) single crystals, single layer graphene (SLG) growth on Ni(111) and Ni(100) thin film growth on Cu(100) single crystals. We analyzed in particular how the different substrates changes the magnetic properties of the molecules measuring the magnetization curves (i.e XMCD vs field).

All the measurements have been taken at the minimum possible temperature, i.e. around 8K

Molecule characterization: XAS and XMCD

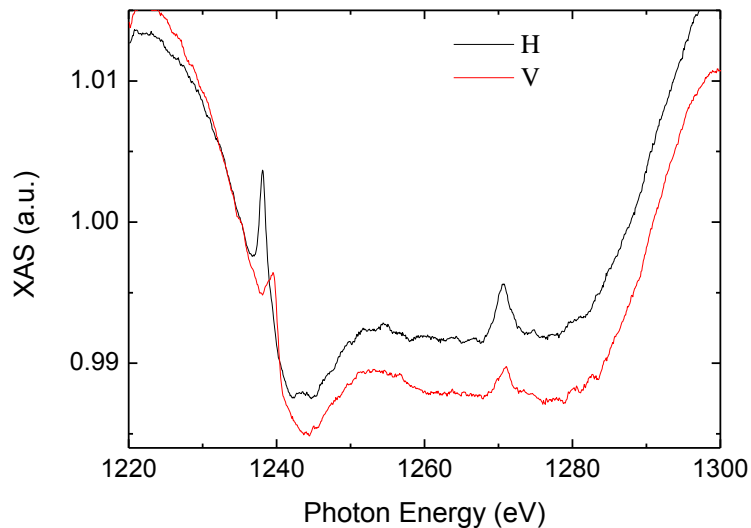
We performed XAS and XMCD on TbPc_2 on the different substrates. The results shown below are general and do not depend on the specific substrate. The typical anisotropy of the molecule is observed.



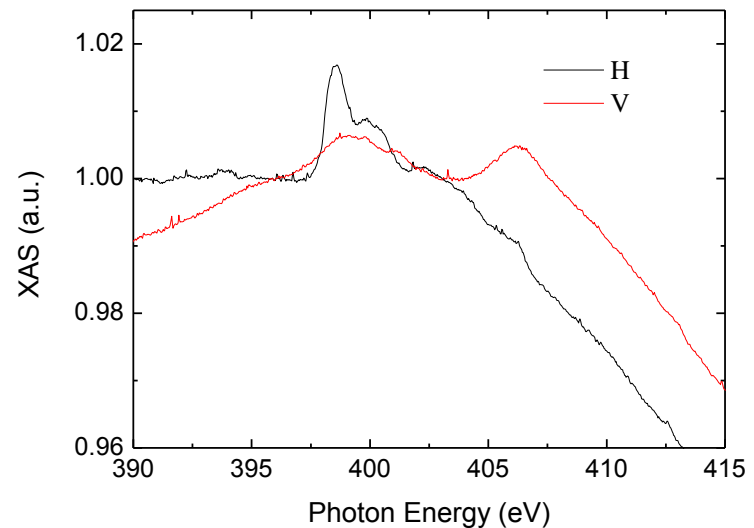
Molecule characterization: XNLD

We performed linear dichroism on both Tb and N edges. The observed dichroism indicates that molecules lie flat on the substrate, with the Pc plane parallel to the surface.

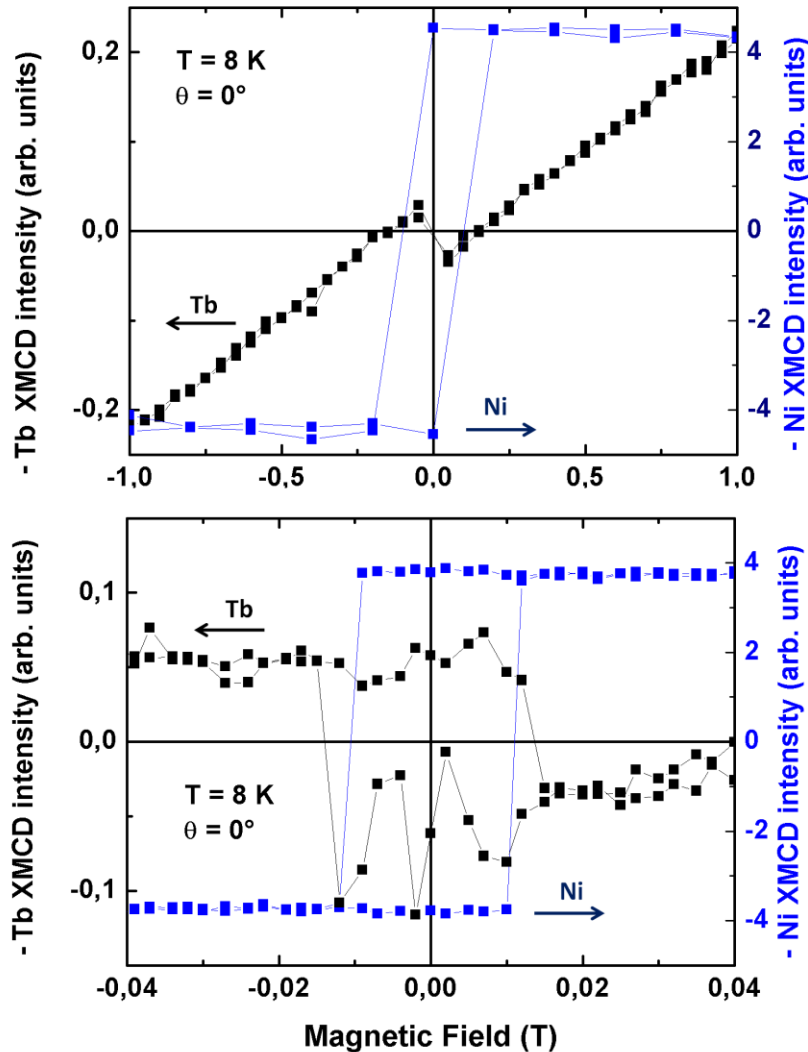
Tb edge



N edge



Magnetic properties: TbPc₂ on Ni(100) thin film

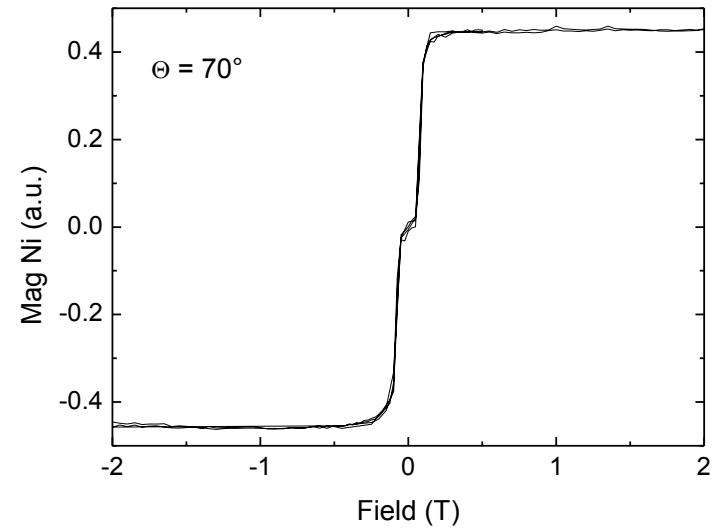
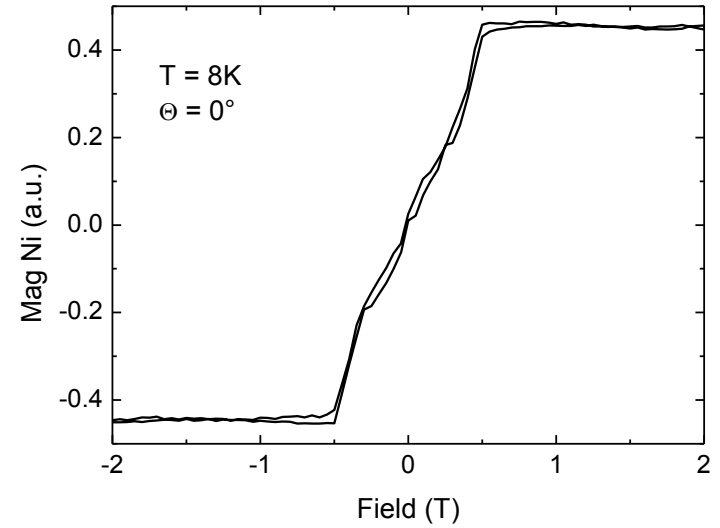
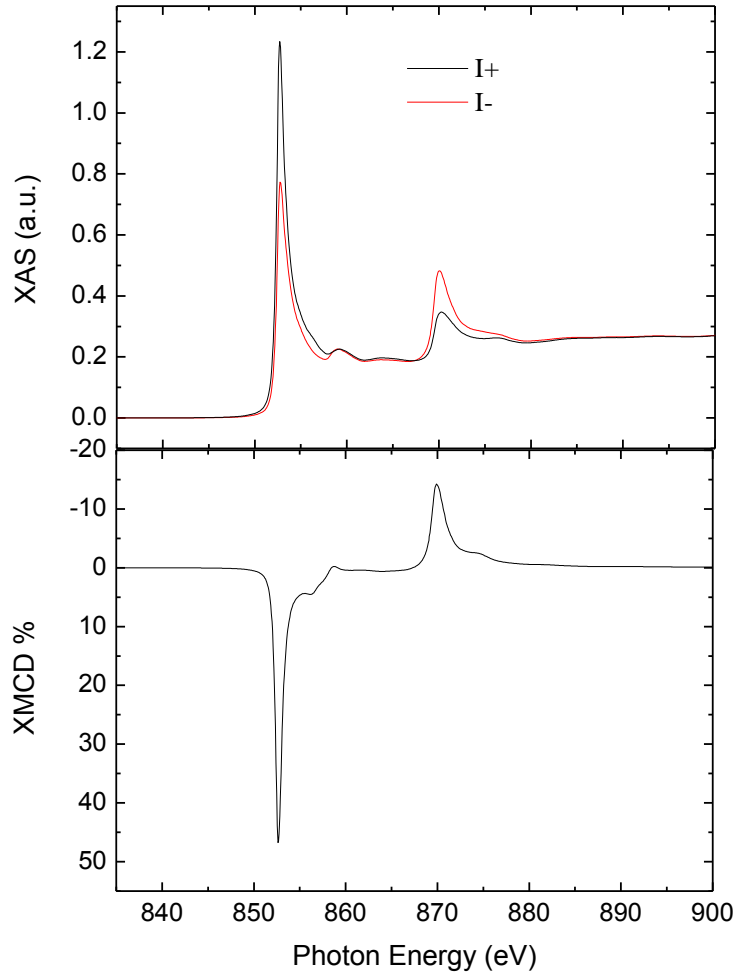


An antiferromagnetic coupling between the TbPc₂ molecules and Ni substrates is observed.

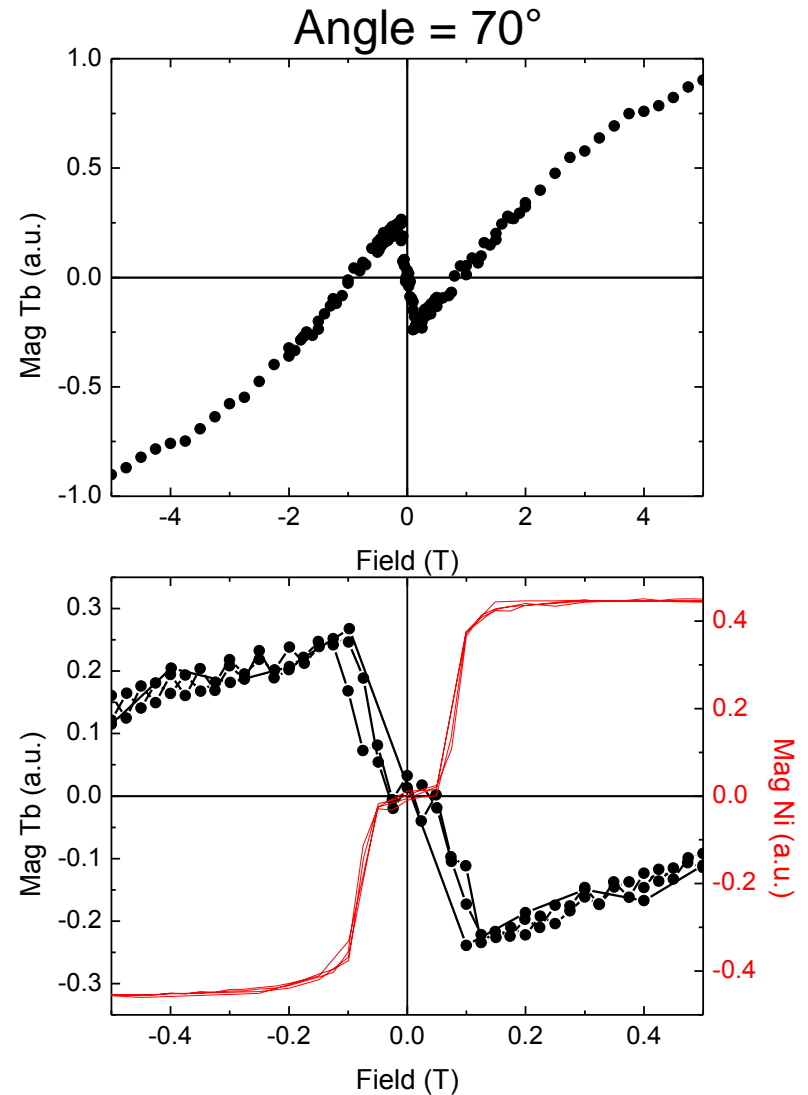
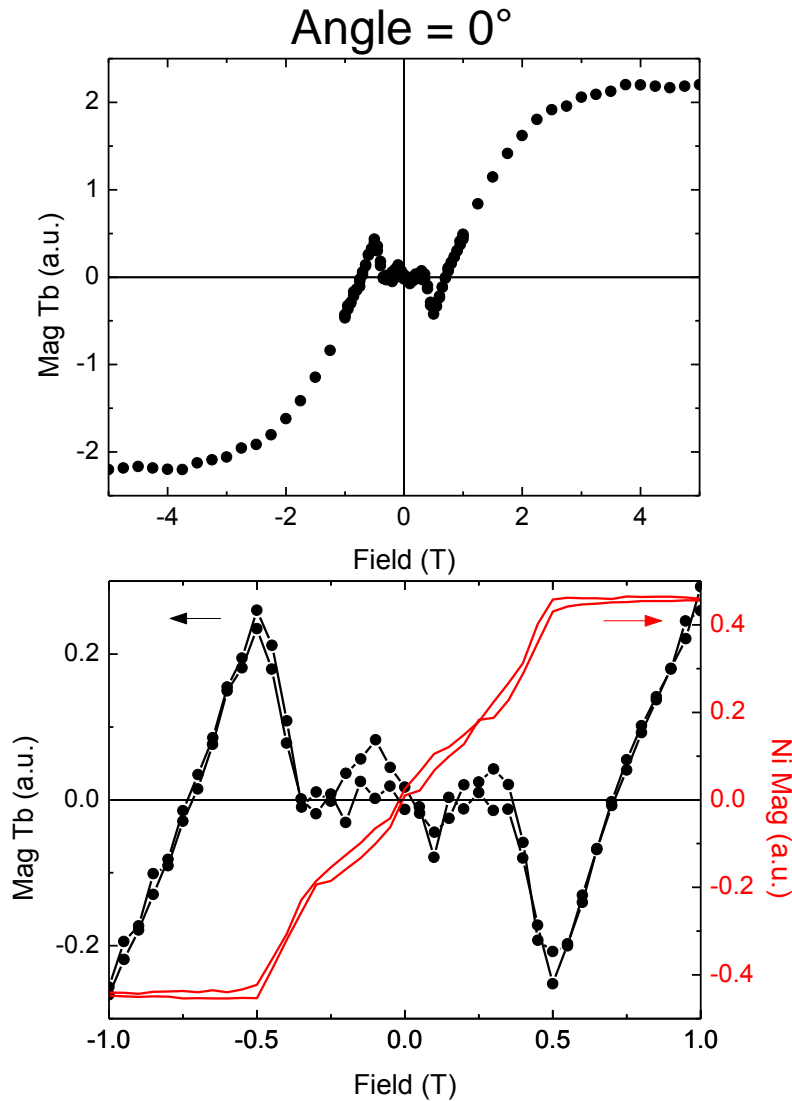
Data have been published in
D. Klar et al., Beilstein Journal of
Nanotechnology 4, 320-324 (2013)

Magnetic properties: TbPc₂ on Ni(111) single crystals

Ni characterization.



Magnetic properties: TbPc₂ on Ni(111) single crystals
Tb magnetization. In the zooms also the Ni magnetization is shown



This behaviour remains visible up to 120 K. The magnetization curve clearly indicates and antiferromagnetic coupling with the Ni substrate