Magneto-optical characterization of $Cr^{II}_{3/2}[Cr^{III}(CN)_6]$ Prussian Blue Analogue films performed by Kerr magnetometry

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Magneto-Optical Kerr Effect (MOKE) technique is a surface technique, which allows to acquire magnetic information from the surface region of a film. This represents an important difference respect to other magnetometry techniques, such as SQUID or PPMS, where the characterization is performed on the overall sample. Moreover, for the magnetic characterization the Kerr magnetometer uses a laser as polarized light source, with a laser spot that can be focalized on the surface of the film with a size of less than 1 μm, allowing to measure magnetic properties with high lateral resolution. Using a variable temperature Magneto-Optical Kerr Effect set-up we have characterized Prussian Blue Analogue (PBA) films obtained by electrochemical deposition.

PBA's are molecule-based magnetic materials that are good candidates for the obtaining of molecular analogues of the inorganic spintronic structures [1]. These materials present great advantages respect to conventional inorganic metals and semiconductors such as their flexibility, transparency, processability, chemical versatility and novel added functionalities. Furthermore certain families of Prussian Blue Analogues are molecule-based ferromagnets ordering near room temperature. In this way, the study of PBA's films with Kerr magnetometer is motivated by the development of molecular spintronics systems such as spin-injecting electrodes and components of spin valves structures.

In this poster, measurements on films of the $Cr^{II}_{3/2}[Cr^{III}(CN)_6]$ PBA [2-3], carried out with a MOKE magnetometer, are going to be shown. Moreover, a study of the morfology of these films has been performed using an AFM microscope with the aim of relating the magnetic properties of these systems with their nanostructure determined by the growth of the sample during the electrodepostion.

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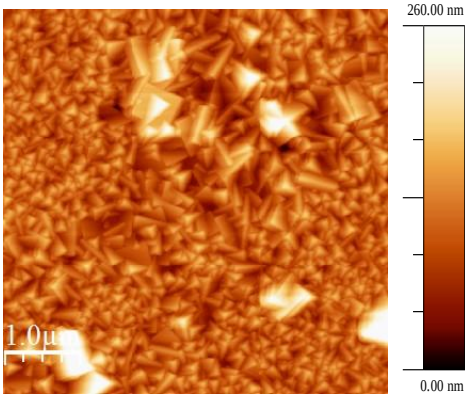

Figure 1 : Topography AFM image (5μm x 5μm) of a 50 seconds deposition time film of PBA $Cr^{II}_{3/2}[Cr^{III}(CN)_6]$ obtained by electrodeposition showing a granular structure

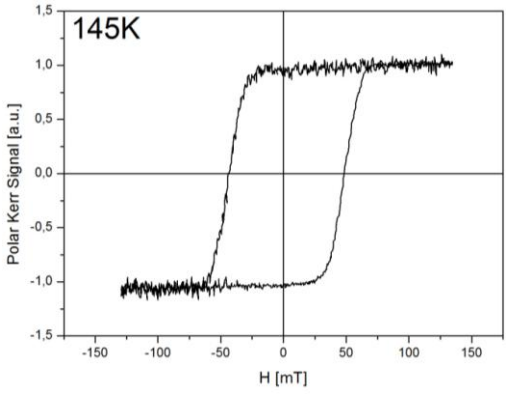

Figure 2 : Hysteresis loop of a 50 seconds electrodeposition time film of PBA $Cr^{II}_{3/2}[Cr^{III}(CN)_6]$ masured at 145 K with the MOKE magnetometer.