ESRF	**Experiment title:** Characterization of Ag(111)/thiol self-assembled monolayers system on clean surfaces and on semiconducting electrodeposited intralayer	**Experiment number**: SI-1407
Beamline: ID32	**Date of experiment**: from: 04/10/2006 to: 10/10/2006	**Date of report**: 26/10/2006
Shifts: 18	**Local contact(s)**: Dr. Isabelle JOUMARD	*Received at ESRF:*

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Report:

Aim of the experiment was to determine the structural properties of CdS films grown by Electro-Chemical Atomic Layer Deposition (ECALE) onto the Ag(111) surface.
I an previous experiment we had observed the presence of several phases of the film with a different orientation with respect to the surface main axes. This disorder was probably due to the poor conditions of the starting Ag substrate surfacem, which result in a disordered growth of the film.
Since then we have worked hard in order to improve the substrate quality either in terms of crystallinity and surface termination. In this experiment we have proven that the Ag termination is quite close to the ideal case and this resulted in the growth of ECALE CdS films with high quality crystalline properties. The grown films have very defined orientations with respect to the substrate with the main axes of their hexagonal structure at ± 11° with respect to the main axes of the Ag(111) surface as observable in Fig.1 in the case of a 30 bilayers film.

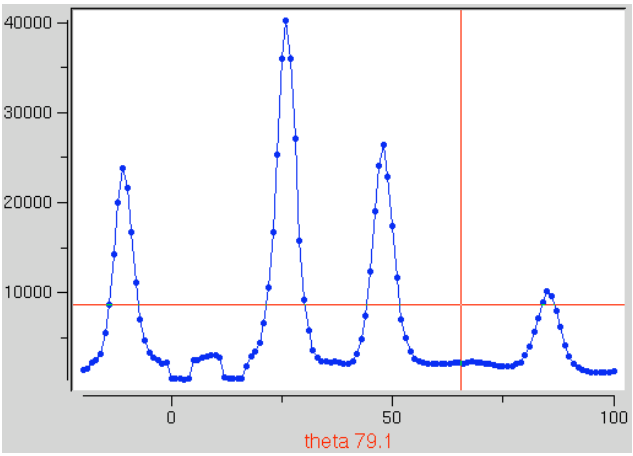

Fig. 1 – 120° long azimuthal scan of a CdS layer showing the peaks coming from the two domains.

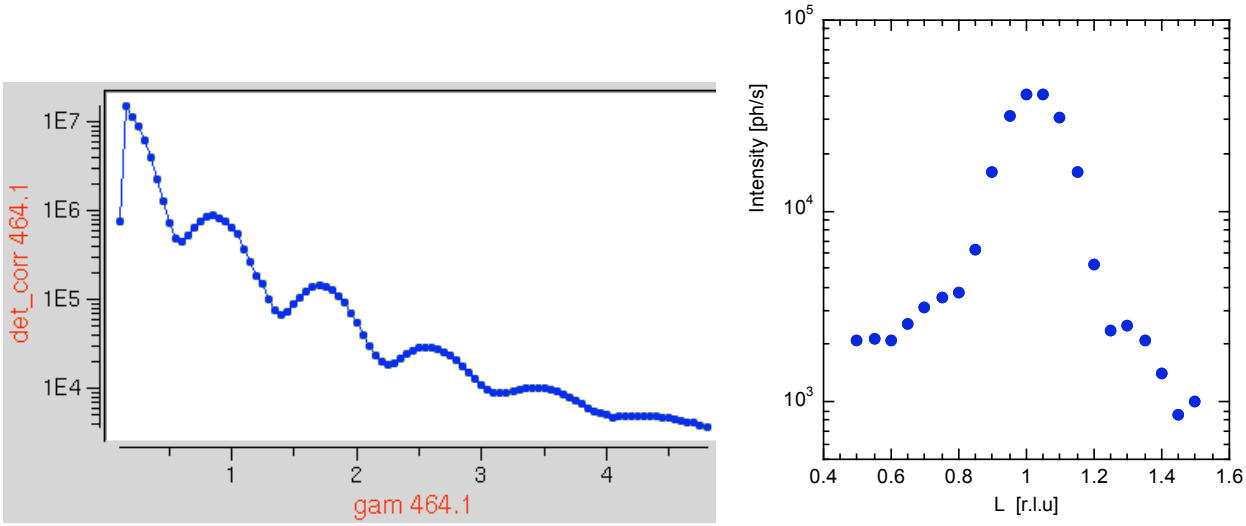

Fig. 2 – Reflectivity curve (left) and (0.61, 0.16, 1.04) Bragg peak intensity of a 30 bilayer CdS film grown by ECALE on the Ag(111) substrate.

In fig. 2 we show, for the same film, reflectivity measurements where the interference fringes are clearly observable and a L-scan at the (1,0,1) position of the CdS film. From the reflectivity we can observe that both the surface roughness and the interface roughness are quite reduced. Moreover the interference fringes result in a total film thickness of about 30Å. In the L-scan are also observable intensity fluctuations due to the finite dimension of the structure. The crystallite dimension has the same value of that one obtained with the reflectivity measurements indicating that the crystallite vertical dimension extends over the whole film thickness. Scans along the H and K directions result in a crystallite dimension of about 150Å. In total we have been able to study about 15 different samples of different thickness and with and without thiols.

We are presently performing a detailed data analysis to determine: the structure of the films, their termination and to determine the thiol adsorption structure.