

In-situ Studies Of Electrochemical Growth At The ID03 Beamline Of The ESRF

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Electrochemistry is important in several topics with practical industrial and technological relevance, ranging from coatings, batteries, solar cells, fuel cells, corrosion, etc. However a detailed structural analysis at an atomistic level is often missing. One of the most used techniques, providing structural information in-situ, is scanning probe microscopy. X-rays are able to penetrate deeply into matter and they can provide information on the structure of a liquid-solid interface during an electrochemically-controlled process.

Aim of this presentation is to show the advancement in this field carried out at the ID03 surface diffraction beamline of the ESRF. We'll present our flow electrochemical cell [1], where surface diffraction experiments can be carried out while controlling the applied potential and with the possibility of exchanging the electrolyte solution.

As examples of systems studied so far we'll show the characterization of CdS films grown on different low index surfaces of silver by the ECALE method [2] and the formation and dissolution of PtZn alloys. In the first case the x-ray diffraction analysis shows that the films prefer to have the hexagonal wurtzite structure with well-defined orientations with respect the substrate. In the second case the formation of a brass-like structure rich in Zn is observed.

References

- [1] M. L. Foresti et al., *Electrochimica Acta* 51, 5532-5539 (2006).
- [2] B. W. Gregory and J. L. Stickney, *J. Electroanal. Chem. Interfac.* 300, 543-561 (1991).

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