27 February 2007

The experiment "**Role of the anions in the underpotential deposition (UPD) of a Cu submonolayer on Pt(111): in situ XAS study**" couldn't be finished during the assigned beamtime on BM32B in 2005. A severe technical problem on the CANBERRA solid state detector forced us to abandon our experiment.
During the experiment SI 1440 in November 2006 we could successfully finish this project, as the following report shows.
Until now, **we never used ESRF synchrotron beam for the experiment: "In situ X-ray absorption study of the hydrogen insertion-desertion on atomic palladium layers epitaxially deposited on Pt(111)".**

Report
Our study wanted to give a better comprehension of the copper Under Potential Deposition (UPD) mechanisms in presence of chlorides. In fact the presence of Cl^- in the solution dramatically affects the shape of the voltamperograms.
For the first time, we could measure the *in situ* XAS signal down to a fraction of Cu monolayer electrochemically deposited on Pt(111) in both perpendicular and parallel polarisation (figure 1).
The presence of a two steps deposition in the Cu UPD in presence of chlorides was clearly evidenced. As the jump heights show (figure 2), at higher potential values (300 mV/ECS) only a half monolayer is deposited, while only at lower potential (100 mv/ECS) the full layer is present.
The good signal/noise ratio of our signals allows the quantitative analysis of the XAS spectra: this analysis is in progress.

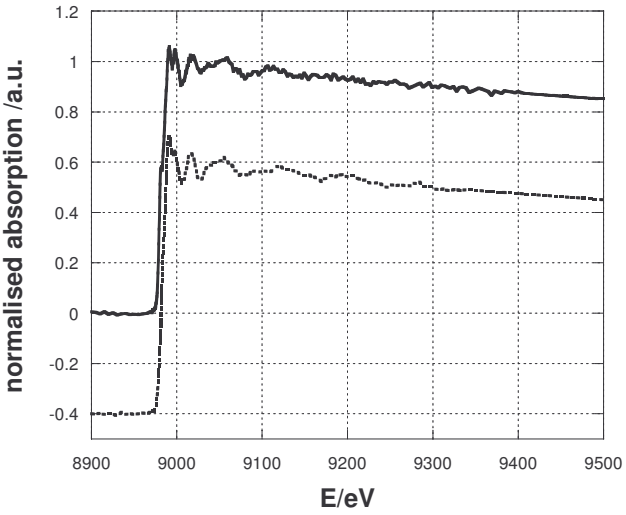

Figure 1: In situ XAS spectra of copper UPD at 300 mV/ECS in parallel (continuous line) and perpendicular polarisation (dotted line) in presence of chlorides.
This signal corresponds to a copper half monolayer.

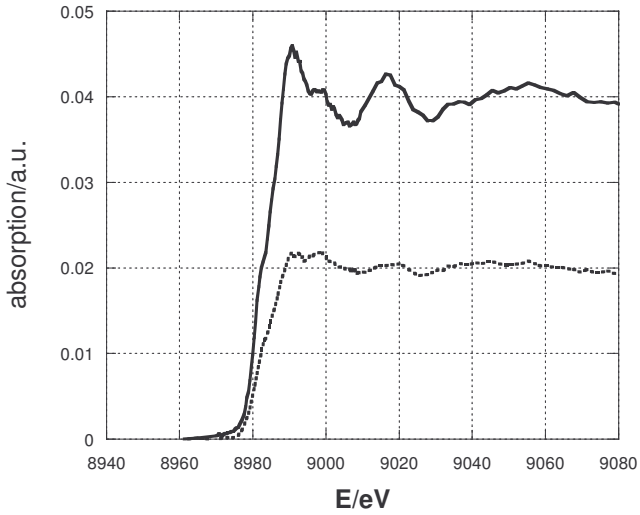

Figure 2: In situ XAS spectra at 300 mV/ECS (continuous line) and at 100 mV/ECS (dotted line) measured with the electric field perpendicular to the crystal surface (perpendicular polarisation).