



Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office using the **Electronic Report Submission Application:**

<http://193.49.43.2:8080/smis/servlet/UserUtils?start>

Reports supporting requests for additional beam time

Reports can now be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.



	Experiment title: Influence of disorder on the electronic properties of Yb-Al compounds	Experiment number: HD 113
Beamline: BM25A	Date of experiment: from: 4 February 2007 to: 6 February 2007	Date of report: 05/02/2008
Shifts: 6	Local contact(s): Dr. German Rafael Castro	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): * Dr. Daniel Rojas Pupo Dr. Luis Fernández Barquin Dr. Jesus Chaboy Nalda Dr. Jose I. Espeso Dr. Jose Carlos Gomez-Sal Dr. Jesus Rodríguez Fernández * Diego Alba Venero		

Report:

Yb LIII-edge X-ray absorption measurements have been carried out in the series of milled YbAl_2 , YbAl_3 alloys and Yb_2O_3 reference sample. The measurements were extended to photon energies above the absorption edge, in the EXAFS region. The results for the YbAl_2 series are displayed in Figure 1. The mean valence of Yb ion was determined by the standard procedure which considers a linear function to account for the background, two Lorentzians representing trivalent absorption with a white line at 8945 eV, and the other corresponding to divalent absorption at 8937 eV, and two modified inverse tangent functions of the absorption edges. The results for the YbAl_2 series show an increase of the mean valence from 2.4 for the unmilled alloy to 2.70 for 120 hours of milling time. On the other hand, the results for the YbAl_3 series of milled alloys are shown in Figure 2. They show that the milling process also induces variations in the electronic state of this intermediate valence material. The analysis of XANES results at 300 K is consistent with a change of the valence from 2.86 for the unmilled alloy to 2.70 for 120 hours of milling time.

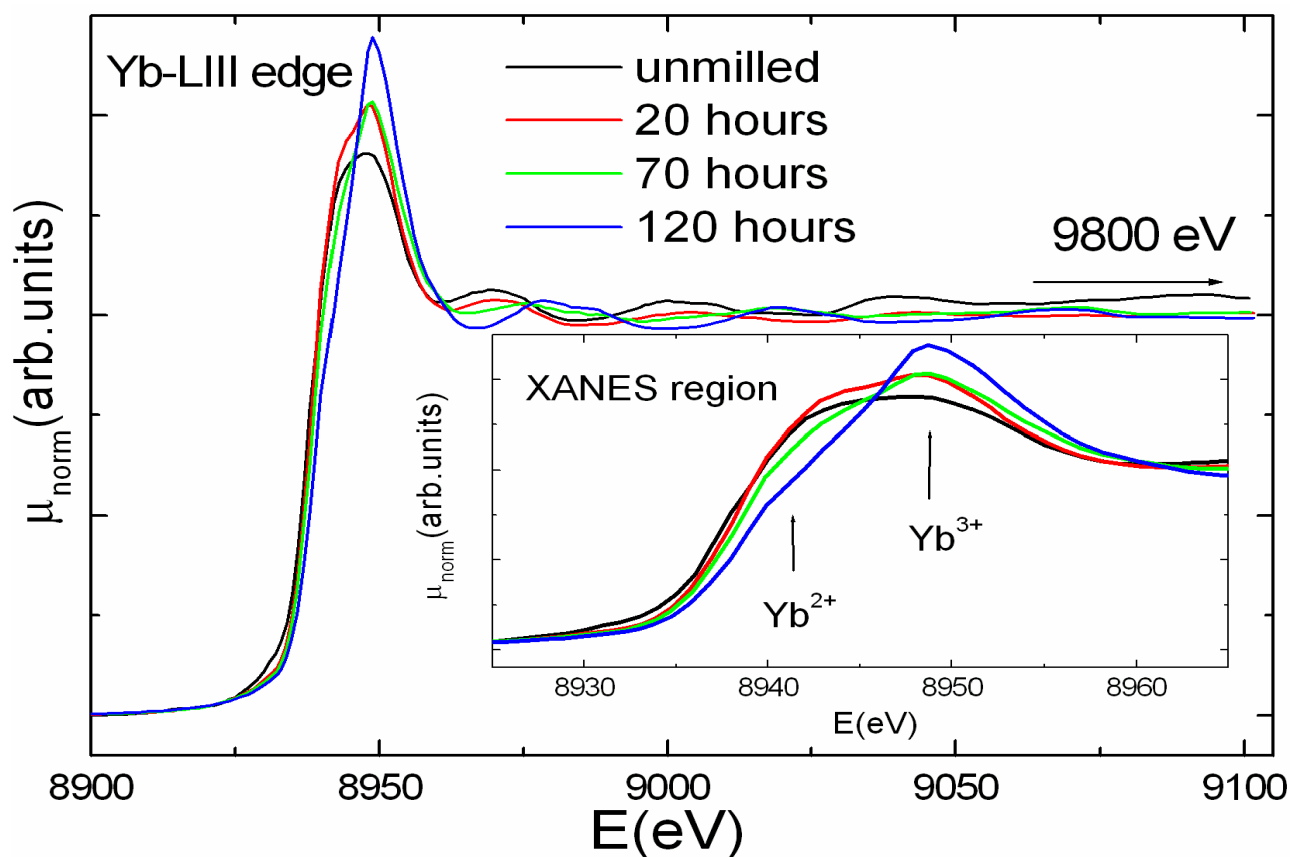


Figure 1- Results of X-ray absorption at LIII edge measurements for the series of YbAl_2 milled alloys. Details around the absorption edge are shown in the inset.

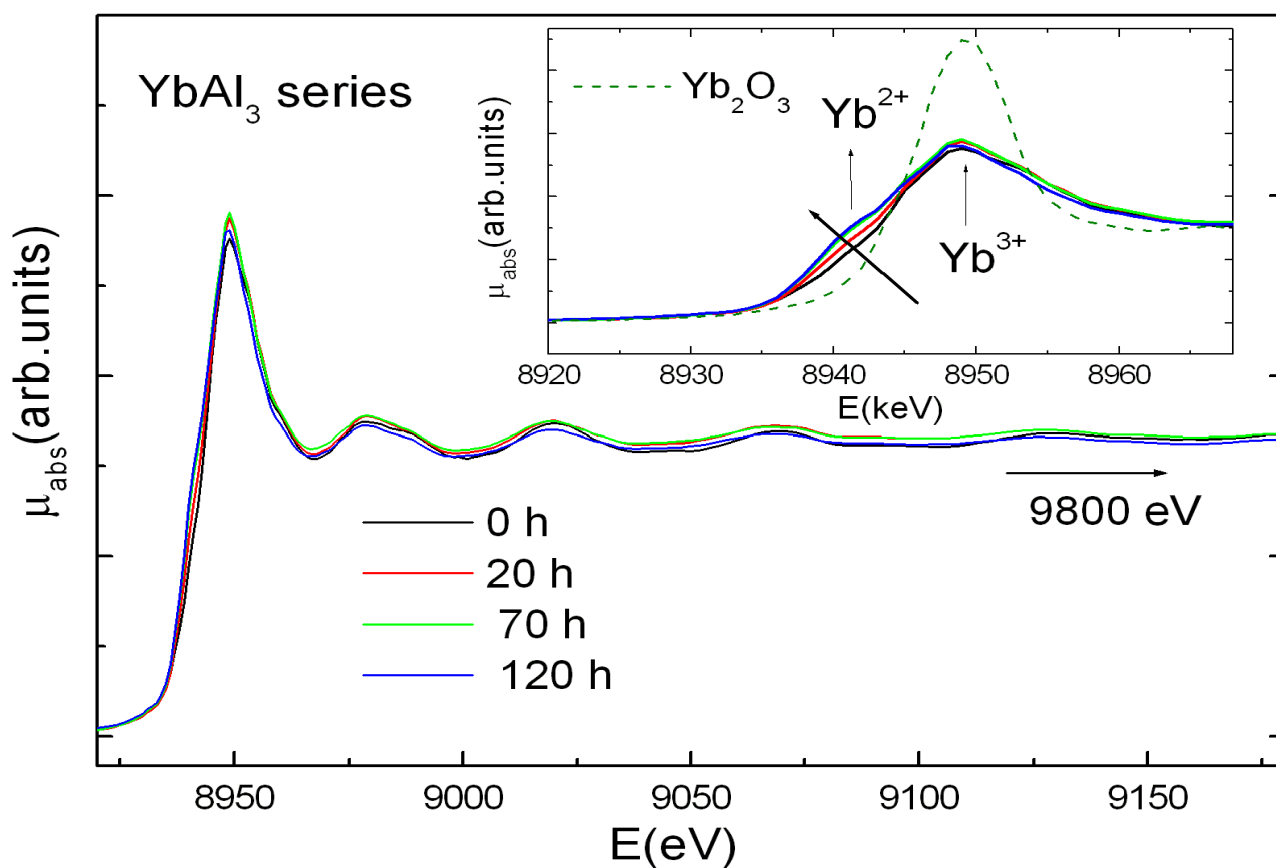


Figure 2- Results of X-ray absorption at LIII edge measurements for the series of YbAl_3 milled alloys. A change in the Yb^{2+} contribution is clearly observed, marked with an arrow, and shown in the inset. The reference Yb_2O_3 has been used for comparison purposes.