

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 via the User Portal:

<https://www.esrf.fr/misapps/SMISWebClient/protected/welcome.do>

Reports supporting requests for additional beam time

Reports can 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: From ultra high vacuum to the electrochemical interface: X-ray scattering studies of model alloy electrocatalysts	Experiment number: SI-2005
Beamline: ID32	Date of experiment: from:25/8/2009 to: 8/9/2009	Date of report: 03/10/2013
Shifts: 18	Local contact(s): Jerome Roy	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): F. McBride *, University of Liverpool, Department of Chemistry, Liverpool L69 3BX, U.K. C. A. Lucas *, University of Liverpool, Department of Physics, Liverpool L69 3BX, U.K. Y. Gründer *, School of Chemistry, University of Manchester, Oxford Road, Manchester, M13 9PL, U.K. M. Darlington*, University of Liverpool, Department of Physics, Liverpool L69 3BX, U.K. A. Brownrigg*, University of Liverpool, Department of Physics, Liverpool L69 3BX, U.K.		

Report:

The Influence of Water and Hydroxyl on a Bimetallic ($\sqrt{3} \times \sqrt{3}$)R30° Sn/Pt Surface Alloy

J. Phys. Chem. C, 2013, 117 (8), pp 4032–4039, DOI: 10.1021/jp3112342

Tin–platinum alloy surfaces show a remarkable activity in the fuel cell reaction, oxidizing and removing CO that would otherwise block reaction on pure Pt. This so-called “bifunctional” mechanism has been attributed to OH adsorption on Sn and CO adsorption on Pt, reducing site competition, and poisoning by CO. In this study, we examine the effect of water adsorption on the structure of the ordered Sn/Pt(111) ($\sqrt{3} \times \sqrt{3}$)R30° surface alloy in order to relate the existing structural data on the behavior of Sn/Pt surfaces to the nature of the adsorbate. The Sn/Pt surface structure was investigated by surface X-ray diffraction (SXRD) and low-energy electron diffraction, and compared to theoretical models obtained from density functional theory and with structural determinations from previous in situ electrochemical experiments. We find that adsorbed water induces a 0.16 Å outward relaxation in the Sn position, similar to that previously ascribed to OH adsorption in electrochemical SXRD measurements. We review the evidence for specific OH adsorption on Sn and suggest that the simple site-based explanation for the activity of this surface to CO is inconsistent with the observed expansion.

