



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>

Deadlines for submission of Experimental Reports

Experimental reports must be submitted within the period of 3 months after the end of the experiment.

Experiment Report supporting a new proposal (“relevant report”)

If you are submitting a proposal for a new project, or to continue a project for which you have previously been allocated beam time, you must submit a report on each of your previous measurement(s):

- even on those carried out close to the proposal submission deadline (it can be a “*preliminary report*”),
- even for experiments whose scientific area is different from the scientific area of the new proposal,
- carried out on CRG beamlines.

You must then register the report(s) as “relevant report(s)” in the new application form for beam time.

Deadlines for submitting a report supporting a new proposal

- 1st March Proposal Round - **5th March**
- 10th September Proposal Round - **13th September**

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.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report in English.
- include the experiment number 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: Copper phosphide electrocatalyst for oxygen evolution reaction operated at high current density	Experiment number: A30-2-1159
Beamline:	Date of experiment: from: 08 Jun 2022 to: 13 Jun 2022	Date of report: 04 Sep 2022
Shifts:	Local contact(s): Antonio Aguilar (email: antonio.aguilar-tapia@cnsr.fr)	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Huabin Zhang KAUST Catalysis Center, King Abdullah University of Science & Technology Zhipeng Wu* KAUST Catalysis Center, King Abdullah University of Science & Technology Shouwei Zuo* KAUST Catalysis Center, King Abdullah University of Science & Technology Yuanfu Ren* KAUST Catalysis Center, King Abdullah University of Science & Technology		

Report:

The increasing global energy consumption has stimulated tremendous research and industrial efforts on the development of sustainable and clean energy. For water splitting to generate H₂ gas, a type of secondary energy converted from renewable electric energy, the development of which has been greatly hindered by a lack of efficient, cost-effective, and robust electrocatalysts. The bottleneck of water splitting mainly stems from an inherently sluggish process, that is, O₂ generation at the anode via the oxygen evolution reaction (OER), which is about four orders of magnitude slower compared with H₂ production at the cathode. This urgently calls for the exploration of efficient and low-cost OER electrocatalysts. Non-noble-metal-based compounds, such as phosphides, selenides, and especially sulfides, have been proven to be efficient OER electrocatalysts in alkaline electrolytes showing comparable and even superior performance than that of the commercial noble-metal-based OER catalysts such as RuO₂ and IrO₂. However, the reaction mechanisms in terms of the local coordination structure and the electronic structure of active centers and the structure–activity correlation behind it remain elusive. In this report, we investigate the evolution of local coordination structure by using Fe-Ni sulfide as model catalyst

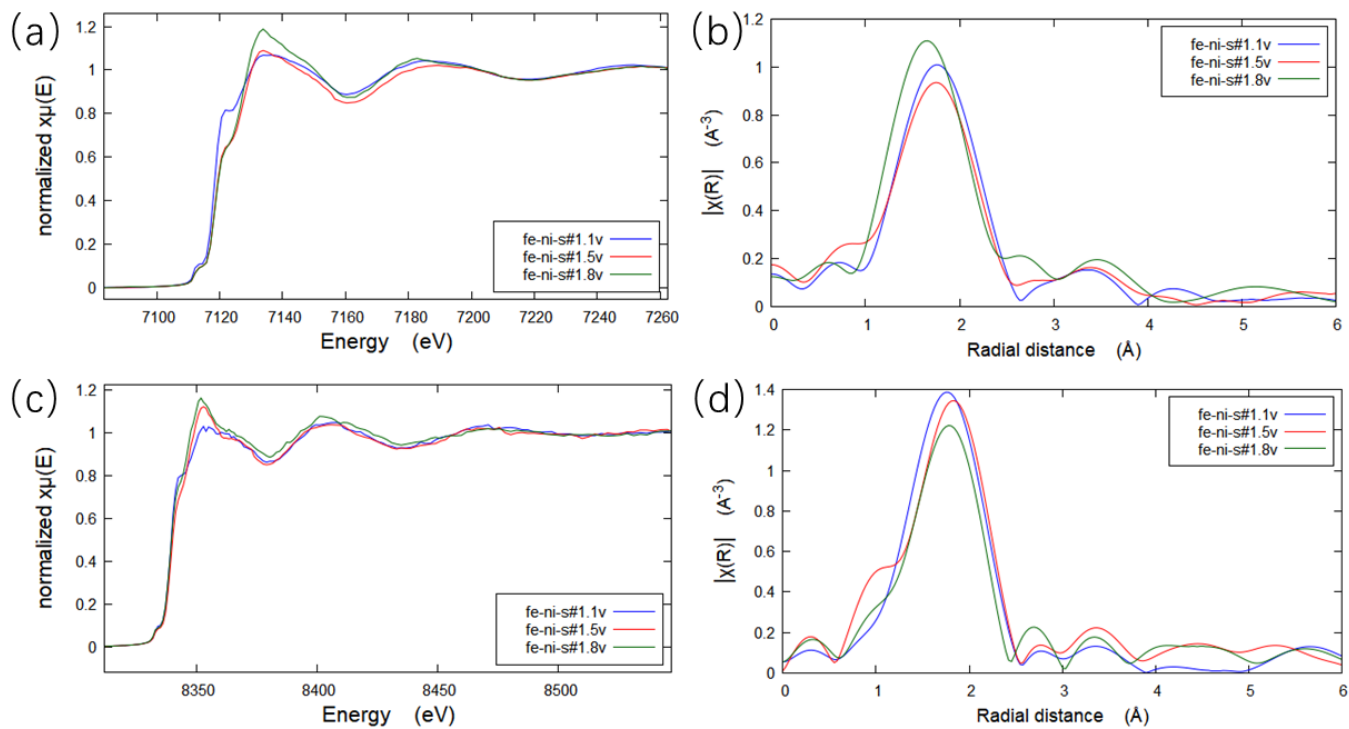


Figure 1

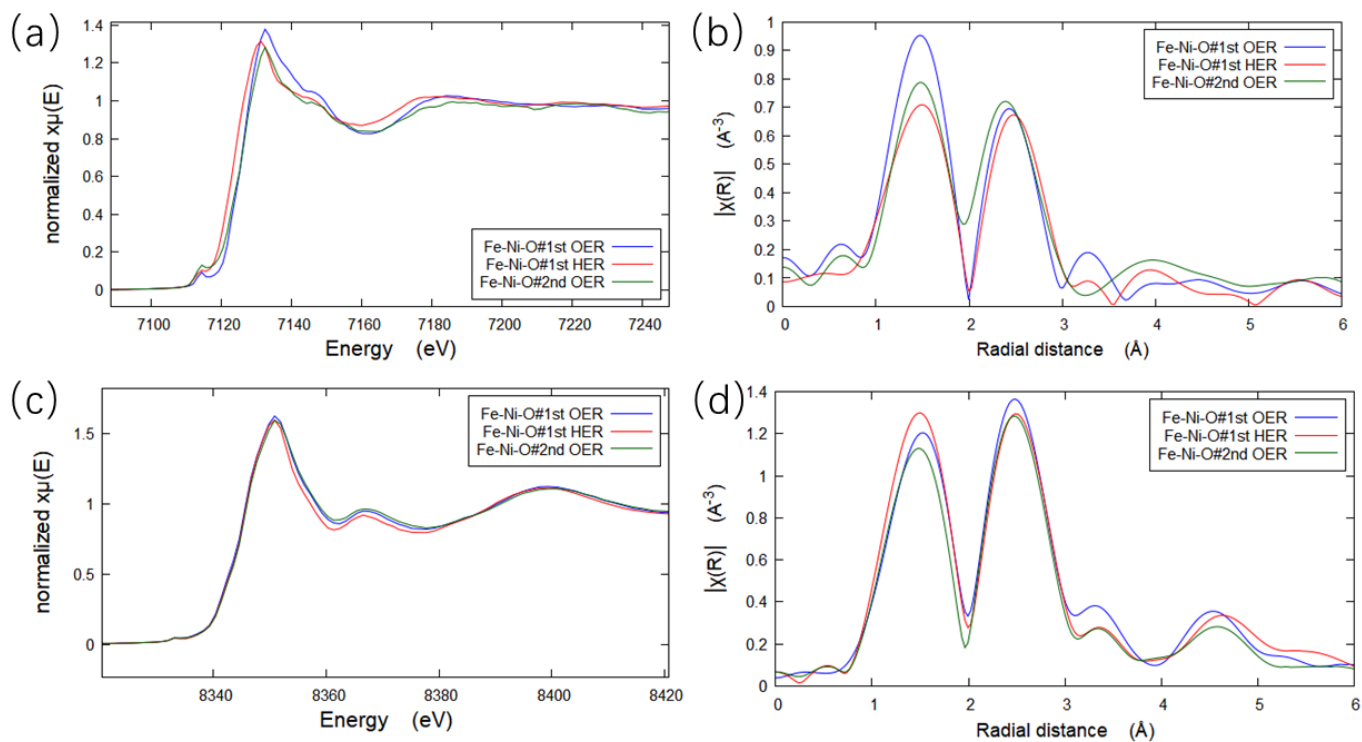


Figure 2

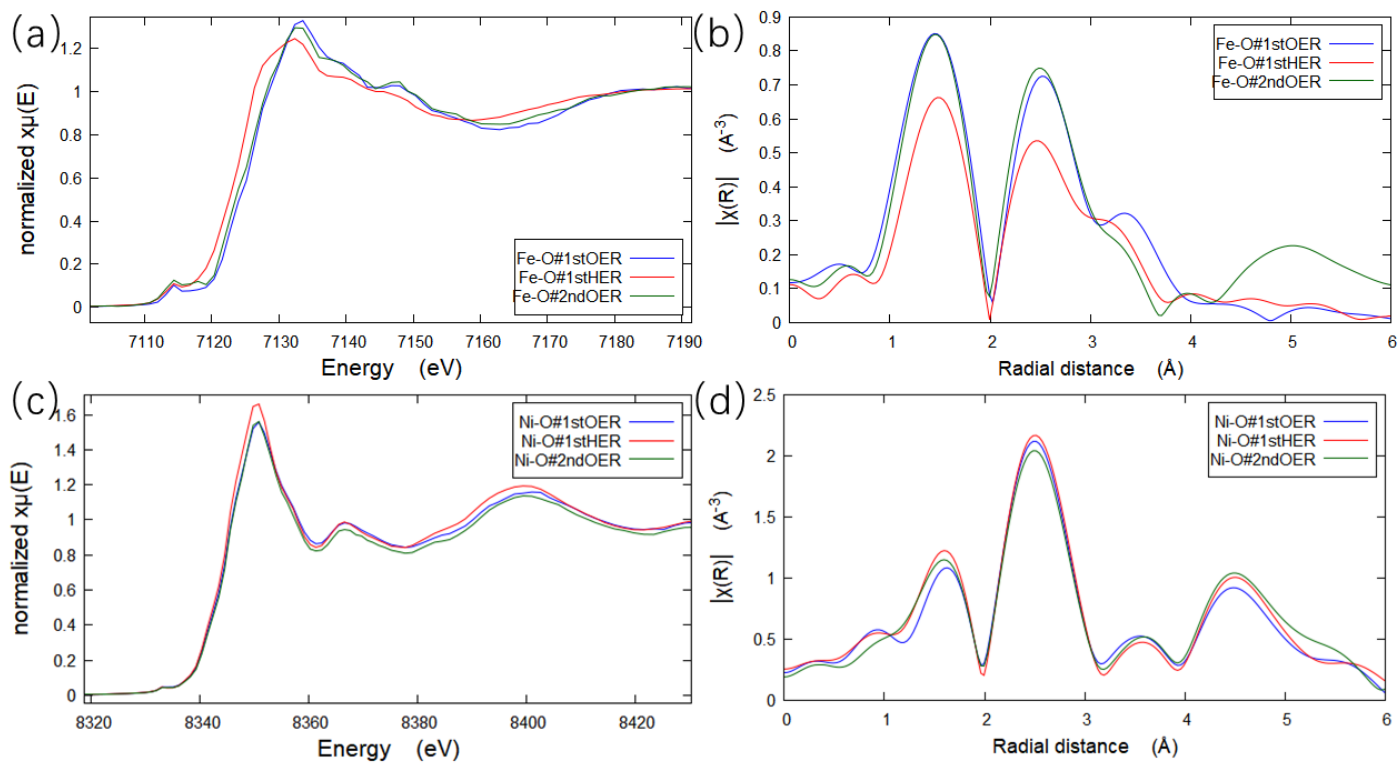


Figure 3