

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: Study of mixed valence uranium oxide systems by resonant inelastic X-ray scattering.	Experiment number: CH-4959
Beamline: ID26	Date of experiment: from: 26 October 2016 to: 01 November 2016	Date of report: 25.09.2017
Shifts: 18	Local contact(s): Dr. Sara Lafuerza	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Dr. Bes René from Aalto University, Finland (experimentalist) Dr. Pakarinen Janne from SCK.CEN, Belgium (experimentalist) Dr. Leinders Gregory from SCK.CEN, Belgium (experimentalist) Dr. Kvashnina Kristina from ESRF, ROBL beamline (experimentalist)		

Report: The main results collected during this allocated beamtime are already published in the following paper :

G. Leinders, R. Bes, J. Pakarinen, K. Kvashnina, and M. Verwerft, *Inorganic Chemistry* 2017, 56, 6784–6787.

DOI: <http://pubs.acs.org/doi/abs/10.1021/acs.inorgchem.7b01001>

Abstract: A fundamental question concerning the chemical state of uranium in the binary oxides UO₂, U₄O₉, U₃O₇, U₃O₈, and UO₃ is addressed. By utilizing high energy resolution fluorescence detection X-ray absorption near edge spectroscopy (HERFD-XANES) at the uranium M4 edge, a novel technique in the tender X-ray region, we obtain the distribution of formal oxidation states in the mixed-valence oxides U₄O₉, U₃O₇, and U₃O₈. Moreover, we clearly identify a pivot from U(IV)–U(V) to U(V)–U(VI) charge compensation, corresponding with transition from a fluorite-type structure (U₃O₇) to a layered structure (U₃O₈). Such physicochemical properties are of interest to a broad audience of researchers and engineers active in domains ranging from fundamental physics to nuclear industry and environmental science.