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ESRF

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 original report should be sent, together with 5 reduced (A4) copies, to the User Office.

In addition, please send a copy of your file as an e-mail attachment to reports@esrf.fr**,** using the number of your experiment to name your file. This will enable us to process your report for the ESRF Annual Report.

Reports accompanying requests for additional beam time

If your report is to support **a new proposal**, the orginal report form should be sent with the new proposal form, and a copy of your report should be attached to each copy of your proposal. 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.
- bear in mind that the report will be reduced to 71% of its original size. A type-face such as "Times", 14 points, with a 1.5 line spacing between lines for the text, produces a report which can be read easily.

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ESRF	**Experiment title:** Surface Structure of NaCl(111)	**Experiment number**: 26-02-118
Beamline: BM26B	**Date of experiment**: from: 07-may-02 to: 27-may-02	**Date of report**: 22. 08. 2002
Shifts: 41	**Local contact(s)**: Dr Igor Dolbnya	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

J. Arsic* ,D. Kaminski*, P. Poodt*, N. Radenovic* and E. Vlieg*

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Report:

The {111} Face of NaCl can in principle terminate in a Na^+ layer or in Cl^- layer. Both terminations result in polar surfaces and should therefore have a high surface energy. The two symmetry related terminations lead to a very low step free energy. Such a face should be rough already at zero Kelvin and not present in the growth morphology.

We have recently discovered that when NaCl is grown in formamide (CH_3NO) solution, the {111} face becomes more stable. It grows more slowly and appears as a flat facet in the growth morphology. The polar nature of the {111} face may lead to a reconstruction, as has been found on similar polar surface [1]. The Structure can, on the other hand, also be stabilized by the presence of the polar formamide.

Here we repport the surface structure of NaCl (111) in vacuum. Crystals, with nicely developed (111) faces, were grown from formamide-water solution. Measurements were performed using an X-ray the energy of 10

keV. The set-up consists of an ultrahigh vacuum chamber, which was coupled to a 2+3-circle diffractometer[2]. The crystal was mounted in the UHV chamber with the surface normal in the horizontal plane. Compared with our first experiments in humid environments, the (111) surface was found to be a much flatter. The best results were obtained on as-inserted samples; annealing always led to rougher surface.

We were able to measure in total 171 reflection from (01), (20), (21) rods and specular reflectivity measurements, with the agreement factor of 16% when averaged over all measured conditions. Figure 1 and 2 represents structure factor amplitudes along (01) and (20) respectively. According to initial analysis surface of (111) NaCl is not reconstructed in vacuum. The question of termination is not clear yet but it seems that Na^+ termination is the most likely.

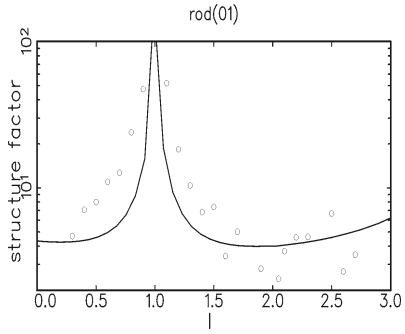

Fig. 1 *Structure factor along the(01)CTR of NaCl(111). Dots represents data points, the curve represents a model calculation of non-reconstructed Na^+ terminated surface*

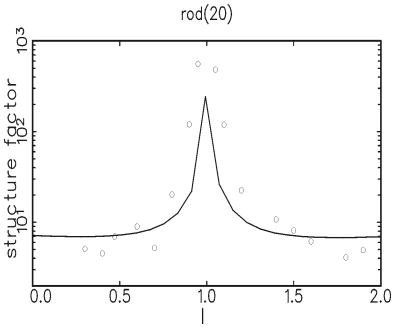

Fig. 2 *Structure factor along the (20)CTR of NaCl(111). Dots represents data points and the curve represents a model calculation of non reconstructed Na^+ terminated surface.*

Data analysis is still in progress.

References:

1 A. Barbier, C. Mocuta, and G. Renaud, Phys. Rev. B **62** (2000).

2 E. Vlieg, J. Appl. Cryst. **31**, 198(1998).