

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: X-ray diffraction study of $Mn_{1-x}Fe_xGe$ under high pressures	Experiment number: HC1877
Beamline:	Date of experiment: from: 15.04.2015 to: 18.04.2015	Date of report: 12.06.2015
Shifts:	Local contact(s): Michael Hanfland	<i>Received at ESRF:</i>

Names and affiliations of applicants (* indicates experimentalists):

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Report:

In order to study possible high-spin to low-spin transition of MnGe expected upon lattice shrinkage, single-crystal of MnGe, $Mn_{0.8}Fe_{0.2}Ge$, $Mn_{0.6}Fe_{0.4}Ge$ were selected and prepared for high-pressure x-ray diffraction experiment. We used diamond anvil cells filled with Ne as a pressure-transmitting medium. It enabled us to reach the pressure of ~50 GPa. Single-crystal x-ray diffraction images were further analyzed using the computer program CrysAlisPro in order to determine the lattice parameters. The obtained equations of state (EOS) were fitted by EosFit7 in terms of Birch-Murnaghan model (Fig 1). None of sharp features in the EOS were observed, still one of the parameters of the model for MnGe, i.e.

B_0' is appeared to be unexpectedly high (8.0 ± 0.3). Whereas, the substitution of Mn with Fe leads to collapsing this anomaly, in particular for the compound with 20% of Fe concentration $B_0' = 6.5 \pm 0.1$. The observed anomaly of MnGe requires further investigations, the preliminary results are in agreement with recently proposed hypothesis of magnetoelastic state that accompanies the spin crossover [1]. A complete analysis of the data collected is in progress.

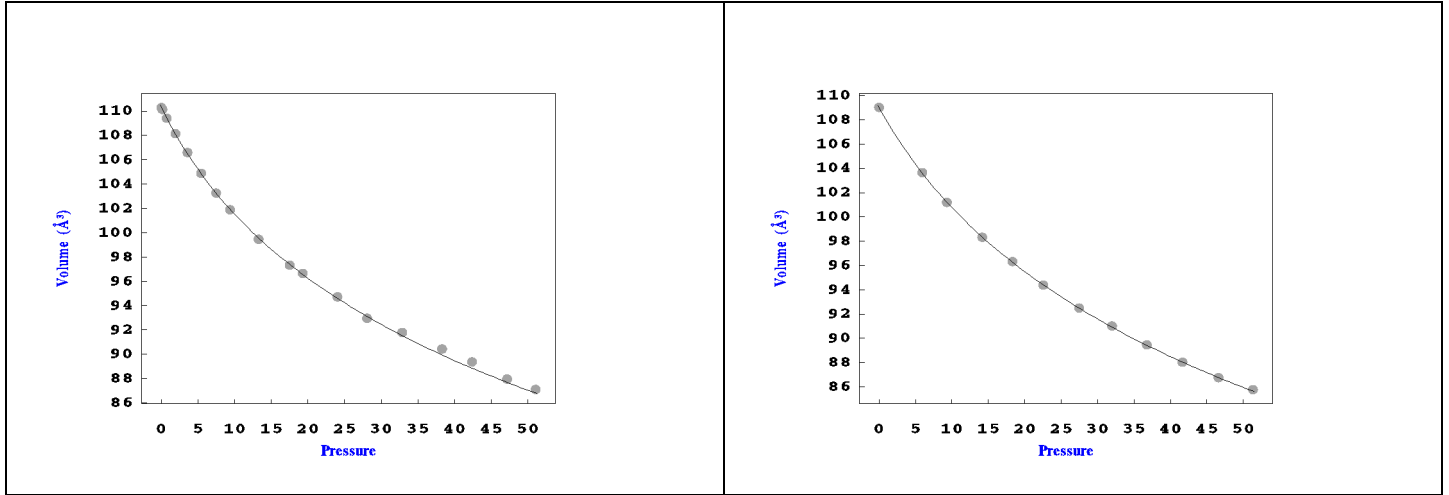


Fig. 1. Experimental and fitted EOS for MnGe (a) and Mn_{0.8}Fe_{0.2}Ge (b).

[1] M. Deutsch, et. al., Phys. Rev. B. 89, 180407(R) (2014).

