Experiment Report Form

The double page inside this form is to be filled in for each experiment at the Rossendorf Beamline (ROBL). This double-page report will be reduced to a one page, A4 format, to be published in the Bi-Annual Report of the beamline. The report may also be published on the Web-pages of the HZDR. If necessary, you may ask for an appropriate delay between report submission and publication.

Should you wish to make more general comments on the experiment, enclose these on a separate sheet, and send both the Report and comments to the ROBL team.

Published papers

All users must give proper credit to ROBL staff members and the ESRF facilities used for achieving the results being published. Further, users are obliged to send to ROBL the complete reference and abstract of papers published in peer-reviewed media.

Deadlines for submission of Experimental Report

Reports shall be submitted not later than 6 month after the experiment.

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 / experiment 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 double-page report will be reduced to 71% of its original size, A4 format. A type-face such as ”Times” or ”Arial” , 14 points, with a 1.5 line spacing between lines for the text produces a report which can be read easily.

Note that requests for further beam time must always be accompanied by a report on previous measurements.

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HZDR HELMHOLTZ ZENTRUM DRESDEN ROSSENDORF ROBL-CRG	**Experiment title: Chemical state of invisible gold in arsenopyrite (FeAsS)**	**Experiment number**: 20-01-713
Beamline: BM 20	**Date of experiment**: from: to:	**Date of report**:
Shifts:	**Local contact(s)**: Dr. Andreas Scheinost	*Received at ROBL:*
Names and affiliations of applicants (* indicates experimentalists): Dr. Juraj Majzlan*		

Report: The goal of this project was to use X-ray absorption spectroscopy to determine the first-shell neighbors of gold in arsenopyrite. We have used ^{197}Au Mössbauer spectroscopy on these samples in the past and determined that the gold is oxidized, i.e., Au^{+}, and therefore does not form nanoparticles in arsenopyrite. However, because of the lack of suitable standard compounds, the Mössbauer spectroscopy cannot provide further details about the local environment of Au in the structure. On the other hand, XAS could complement the techniques used and provide the last missing piece of the puzzle.

In this work, EXAFS spectra were collected on the Au L_{III} edge (11919 eV) on two arsenopyrite samples. The bulk gold concentration, measured by conventional techniques (digestion in aqua regia and ICP-MS analysis), was about 100 ppm, deemed sufficient for the proposed experiments. Yet, the experiments showed no signal from gold. It is not clear what was the reason for this failure. In the future, we will try to identify arsenopyrite samples with higher gold concentration and repeat the experiments.