ORSO sample environment sessions 1&2

26/06/2025 10:00-12:00 & 20:00-22:00 CET

Present:

Anton Le Brun, Jennifer Gilbert, Andrew Nelson, Huan-hua Wang, Michael Haberl, Philipp Gutfreund, Max Skoda, Artur Glavic, Grace Causer, Adrian Rennie, Jos Cooper, Tom Arnold, Glenn Coope, Sebastian Köhler, Bridget Murphy, Oleksandr Tomchuk, Sophie Ayscough, Ben Humphreys, Rebecca Welbourn

Presentation:

Introduction of the ORSO sample environment group by Sophie Ayscough and Ben Humphreys

Summary of the results of the ORSO sample environment survey.

Notable discussion points:

How can the sample environment group support the community best?

> Should we create a specific sample environment sample list with updates on developments? Or does that create too much spam? After the move to the new email server such a list should be easy to create. The content for such an email list would contain general updates on new sample environments and users could send in their new interesting environments. It could also be a place to ask for advice with sample environments. It should be focussed on resource sharing, where to do an experiment, what environments exist where… It could be a two-way mailing list where everyone can send mails to the list.
>
> There is a sample environment society (ISSO) who do useful meetings and trainings. We should interact with them. They only have people associated with facilities participate in discussions which makes it difficult for university people to contribute. ORSO could fill this gap to interact with the user community and then feed that into ISSO.
>
> A slack channel could be an option for a sample environment support chat. ORSO already has a general slack channel which is linked on the website.

Users supplying their own cells

> ANSTO has almost everyone use facility cells. Providing engineering drawings for interested users would be useful, which exists at some facilities (ILL/ISIS). Facilities should coordinate their efforts in this regard.
>
> People optimise cells for very specific purposes. There is a problem with transferability from instrument to instrument, but also coming back to an

instrument later and their self-built cells don't fit anymore because mounts or available space changed. There needs to be more information available about fittings and e.g. beam heights for sample environments. Not enough facilities provide that.

Simultaneous measurements (QCM, AFM, etc)

Adds overhead to setup. One really needs to want it for making it worth it. Example: ATR at INTER restricts sample changing significantly.

These specific designs are often done independently. We should share more. Papers are the only way to let people know about sample environments so far. The sample environment mailing list could be a good way to improve the situation.

Facility intellectual property might be a barrier for sharing. The exact rules should be identified. Publishing under open licence could help here.

3D printing

ANSTO has been starting to use 3D printed cells. They are much cheaper and could decrease entrance barrier for users to supply their own cells. Many universities have 3D printers nowadays. Current designs require drilling through the silicon block which is a bit complicated. Good solvent exchange could get more complicated with these designs.

Substrates

Swiss neutronics explores polishing silicon blocks.

One has to be careful with roughness for polishing, as people use different definitions. ISIS gave these parameters to polishers in the past: Polish 1 face <3A RMS roughness (not Ra), Waviness 1e-4 rad, Flatness Lambda/10, Field 60x30mm. A community definition would be a good thing here.

Different facilities are working on less damaging cleaning protocols to increase block lifetime. A systematic study on this could be useful. As cleaning also affects surface chemistry this can have a huge effect. Different experiments will require different procedures.

Temperature control

ILL/ISIS cells have a delay between recorded temperature and temperature at the substrate surface. That can be a problem for kinetic measurements and will be even more important with the fast measurements to come at ESS. ILL works on cells with better temperature measurements.

Different substrates and liquids have different thermal capacity and conductivity which affects the temperature equilibration. This has to be taken into account for rapid temperature changes.

PNR often needs low temperatures, but they have mostly what they need.

Survey results

Participation so far has mostly been neutron users. How do we extend that to x-ray people?

Seminars

There is a lot of interest in specific sample environments. Should there be a regular sample environment seminar? Could be focussed sessions on specific cells. This kind of event could also make people more interested in ORSO because it is more graspable for users.

Deposition capabilities

Which facilities do have deposition capabilities? ILL's multilayer group can deposit gold layer of good quality but doesn't have that as a user service. It could be useful to make that available in case there is capacity.

Sample environment list

Information on different sample systems should be available as a list on the ORSO website. Small details like the fitting sizes for cells and a comparison between different cells would be useful for users. Timestamps are important to determine how up-to-date the information is. If possible, it would be useful to have manuals for the different sample environments on the website. Contact information and pictures for each cell would be useful, too. Should there be silicon block suppliers on the list?