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Recent Developments in Sample Environment at ACNS

Here we present some recent developments on sample environment equipment at ACNS, which markedly improve the existing capabilities for a range of beamline instruments, leading to greater scientific outcomes and operational efficiency.

A six-position thermalised sample changer with tumbling capability, which avoids sedimentation and particle size separation in samples suspended in a medium, has been designed for use on USANS. To date, USANS experiments have successfully been completed with a prototype applying both independent temperature control and tumbling. An equivalent thermalised sample tumbler for use on SANS is currently undergoing development.

A new sample positioning probe made from composite materials has been designed to reduce the sample cooldown time in top-loading cryostats. Fabricating probes from thin-walled carbon fibre, which is both lightweight and a poor thermal conductor, has resulted in a two-thirds reduction in the sample cooling time when compared with standard stainless steel sticks. Future work will look to incorporate these features in other applications such as for gas delivery probes.

The Rotational Paris Edinburgh Cell, capable of providing both high pressure and controlled high shear to investigate in areas of physics, chemistry, earth and planetary sciences, has been commissioned at ACNS. It is believed to be one of only two high pressure/shear Paris Edinburgh presses worldwide. This added sample environment capability opens up new experimental possibilities in high pressure – high shear regimes for users. A stretch goal is to add a high temperature capability to the ROPEC, creating a rare trio of extreme temperature – pressure – shear.

Topic

Neutron Instruments & Techniques

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