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Which glue to choose? A neutron-scattering study of various adhesive materials and their effect on background scattering.

We have investigated the background scattering from numerous, frequently used sample adhesives to determine the background contribution of these glues when used for inelastic-neutron-scattering measurements. Starting with a bare Cu sheet, we have trialled different glues such as GE-varnish, Teflon tape, Fomblin oil and two-component epoxy glue. Measurements were collected using the cold-neutron Time of Flight (TOF) spectrometer, PELICAN which is capable of collecting data over a wide range of Q - ω space simultaneously. Results indicate that those glues containing hydrogen gave much higher background signals, while those that did not contain hydrogen had a much smaller impact on the background signal. This was observed for both elastic and inelastic neutron-scattering.

While it is widely understood that mechanical fastening with copper or aluminium is often the best method for reducing additional and unwanted neutron scattering, it is not always the most practical method. Thus this study has been performed on numerous glues to investigate their effect on both elastic and inelastic background. By keeping all other variables constant (eg instrument configuration, sample environment, copper-sample plate), a direct comparison can be made between each sample. By performing measurements on the TOF spectrometer, PELICAN, we have been able to visualise the data in a number of ways to extract scattering in the elastic channels, inelastic channels and also for diffraction, thereby showing relevant scattering profiles for many commonly used neutron scattering techniques.

Topic

Neutron Instruments & Techniques

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