

Experimental Report

13/07/2015

Proposal: TEST-2451 **Council:** 10/2014
Title: Comparative background and material test for P-cells on TOF- and BS- instruments at P_atm
This proposal is a new proposal
Research Area:

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Samples: Aluminium alloy
zirconium alloy
Niobium
Glycerol

Instrument	Req. Days	All. Days	From	To
IN6	2	2	21/04/2015	23/04/2015
IN16B	1	1	16/05/2015	18/05/2015
IN13	1	1	18/06/2015	19/06/2015

Abstract:

Exp. Report Test 2451 on IN13, 18-19/06/2015

Determination of the best material and geometry for high pressure cells in view of the LTP_6_7 project

Several test experiments were undertaken on IN6, IN13 and IN16B in order to determine the best high pressure cell for the LTP_6_7 project.

On IN13, we measured 4 samples:

- Al 7049 12 mm scotch
- Al 7049 12 mm empty
- Al 7049 6 mm scotch
- Al 7049 6 mm empty.

First we measured the transmission of the samples: it is evaluated from the ratio of the counting on a monitor 2 just after the sample divided by the counting on a monitor 1 just before the sample and normalized to the same ratio of the empty instrument. As the HP cells are very thick, a lot of background comes from the Al in the beam. To decrease this background we put a pinhole in front of the monitor2. Unfortunately, the sample stick is very distorted so that we were never able to put it into the cryostat exactly the same way as before, what introduces certainly big errors.

The results are as follows:

- Al 7049 12 mm scotch: 67 % transmission
- Al 7049 12 mm empty: 61.8 % transmission
- Al 7049 6 mm scotch: 92.3 % transmission
- Al 7049 6 mm empty: 88 % transmission.

In both cases, the transmission is lower for the empty cell, but the inverse should be the case. It shows the high uncertainty due to the stick geometry, but also that there is not much difference with and without the scotch on IN13.

Then we measured elastic counts and quasi-elastic scans for all 4 samples.

Elastic measurements:

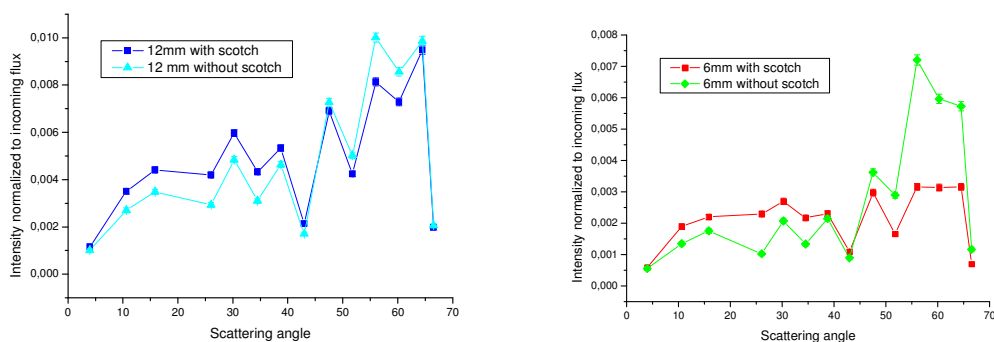


Figure 1

The peak between 50 and 70° is the aluminum peak and changes a lot depending how the stick was put into the beam. But below the peak we have clearly a signal from the sample, as in both cases the corresponding curve is above the curve without scotch.

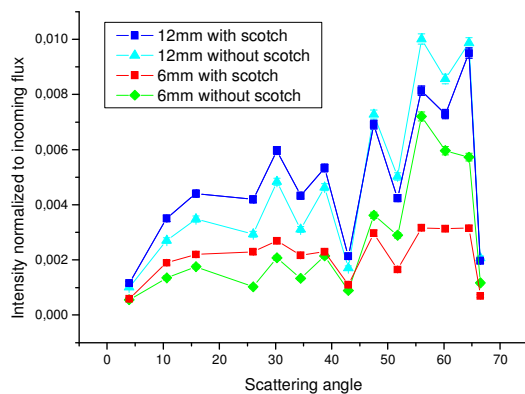


Figure 2

Figure 2 shows all curves together : the difference with and without scotch is almost the same in both cases or even a little bit higher for the 12mm cell.

Quasi-elastic measurements:

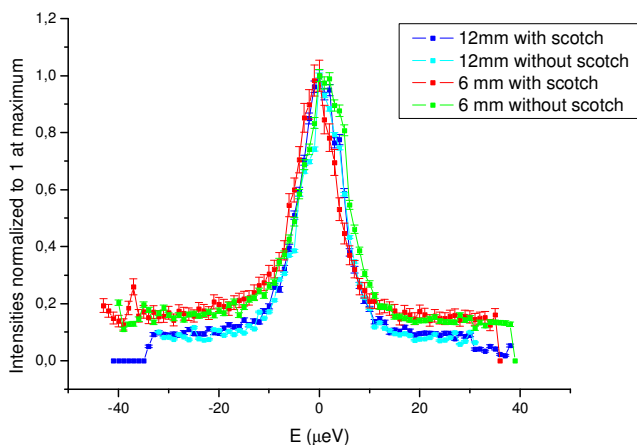


Figure 3

Figure 3 shows quasi-elastic scans, normalized to unity at the maximum and all curves shifted more or less to a common center. It appears that the signal to noise ratio is better for the 12mm cell.

The results on IN6 and IN16B gave the same indications so that the tests were concluded now.