**3T2 High Resolution Powder Diffractometer**

<table>
<thead>
<tr>
<th>Type of instrument</th>
<th>Two-axis diffractometer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monochromator</td>
<td>Vertically focusing Ge (335)</td>
</tr>
<tr>
<td>Incident wavelength</td>
<td>1.225Å</td>
</tr>
<tr>
<td>Collimation</td>
<td>( \alpha_1 ) variable (10°, 14°, 21°)</td>
</tr>
<tr>
<td>Maximum beam size at specimen</td>
<td>20 x 60 mm^2</td>
</tr>
<tr>
<td>Detectors</td>
<td>50 He detectors, 2.4° apart</td>
</tr>
<tr>
<td>Angular range</td>
<td>( 5 &lt; 2\theta &lt; 122° )</td>
</tr>
<tr>
<td>Typical step size ( \Delta(2\theta) )</td>
<td>0.05° (minimum ( \Delta(2\theta) ) 0.02°)</td>
</tr>
<tr>
<td>Typical acquisition time ( \Delta T ) ( \alpha_1 = 10' )</td>
<td>12h &lt; ( \Delta T &lt; 24h )</td>
</tr>
<tr>
<td>Relative flux &amp; Cagliotti Profile parameters (FullProf, Jana : multiply by 1000)</td>
<td>( \alpha_1 = 10' ) ( \phi = 1 ) ( U = 0.255, V = -0.385, W = 0.196 ) ( \alpha_1 = 14' ) ( \phi = 1.15 ) ( U = 0.311, V = -0.429, W = 0.201 ) ( \alpha_1 = 21' ) ( \phi = 1.25 ) ( U = 0.432, V = -0.547, W = 0.232 )</td>
</tr>
<tr>
<td>Asymmetry (Van Laar &amp; Yelon)</td>
<td>( S_L = 0.031, D_L = 0.056 )</td>
</tr>
<tr>
<td>Ancillary equipment</td>
<td>Cryofurnace (1.5 K - 550 K)</td>
</tr>
<tr>
<td></td>
<td>Furnace ( T &lt; 1200^\circ ) ( C ) ( P \approx 10^{-4} ) mbar or ( T&lt;1000^\circ ) ( C ), gas flow</td>
</tr>
</tbody>
</table>

--- 3T2 (January 2014) ---

3T2 is a high resolution two-axis diffractometer dedicated to neutron powder diffraction studies of samples with primitive unit cell volume up to \(~1000\) Å. Typical applications deal with solid state physics, chemistry and material science (High-resolution refinements of nuclear structures in the range \( 2K < T < 1300K \), in complement to XRD or magnetic structure studies on G4.1).

- Precise localization of light elements (H/D in metal deuterides for H-storage)
- Distinction between neighbouring elements in the periodic table (Transition metals such as Mn/Fe, in complement to X-ray powder diffraction)
- Accurate estimation of temperature factors.

3T2 is complimented by the high resolution, cold diffractometer G4.4 for the study of larger systems.

Instrument scientist: F. Porcher (florence.porcher@cea.fr)
Technical support: X. Guillou / J. Dupont