



	<b>Experiment title: In situ characterization of the reversible stress-induced martensitic transformation in new titanium-based alloys with superior superelasticity</b>	<b>Experiment number:</b> MA-3956
<b>Beamline:</b> ID22	<b>Date of experiment:</b> from: 08/06/2018 to: 12/06/2018	<b>Date of report:</b>  <i>Received at ESRF:</i>
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## **Report:**

Cyclic tensile tests were performed in order to characterise the reversible stress-induced martensitic (SIM) transformation occurring in some metastable  $\beta$  Ti-based alloys and which is responsible of superelasticity or shape memory effect. Diffractograms were acquired during tensile tests at each increasing step (from 1% to the rupture) under load, i.e. by maintaining the stress applied, and after a total release of the stress. This will allow to detect the occurrence of the SIM transformation and its reversibility.

Several alloy compositions were analysed in order to understand the effect of different alloying elements and/or heat treatments on the superelasticity and lattice parameters of all detected phases. All the alloys were elaborated in our lab and belong to a new class of superelastic alloys with improved superelasticity. Each experiment has duration of approximately 8 hours. In order to get the maximum of information, both 1D and 2D detectors available on the beam line were used.

Data are currently analysed and first results show that experiments were successfully performed. The obtained results are expected to bring new highlights about the SIM transformation in this new class of superelastic  $\beta$  titanium alloys. At least three publications are expected from these experiments.