

Experimental report

13/02/2020

Proposal: TEST-3084

Council: 10/2019

Title: Martensitic transformation of Ni-Mn-Ga

Research area:

This proposal is a new proposal

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Samples: Ni-Mn-Ga

Instrument	Requested days	Allocated days	From	To
IN3	1	1	20/01/2020	21/01/2020

Abstract:

Martensitic transformation of Ni-Mn-Ga

We performed an experiment on modulation satellites positions for the five-layered modulated (10M) martensites of Ni-Mn-Ga and Ni-Mn-Ga-Fe single crystals to get the complementary data to the q-scans obtained in our D9 and D10 experiments (5-41-950, 5-15-626).

Our previous measurements indicated the temperature-induced transition from commensurate to incommensurate 10M modulated martensite with a thermal hysteresis. The transition was reflected in the changes in the diffraction satellites between (220) and (400) reflections. For the incommensurate phase, the appearance of the greater amount of diffraction satellites was detected. We aimed to obtain complementary data by measuring the additional q-scans in the wider range and between different reflections (where instrumentally possible) using the IN3 diffractometer.

During our IN3 experiment, two samples were examined: $\text{Ni}_{50}\text{Mn}_{27}\text{Ga}_{22}\text{Fe}_1$ and $\text{Ni}_{50}\text{Mn}_{27.7}\text{Ga}_{22.3}$. Analysis of the currently obtained data proved the appearance of the additional diffraction satellites ascribed to the incommensurate phase in the wider region of the reciprocal space; see Fig. 1 for illustration. It also provided base for more precise calculation of the magnitude of the modulation vector at the room temperature.

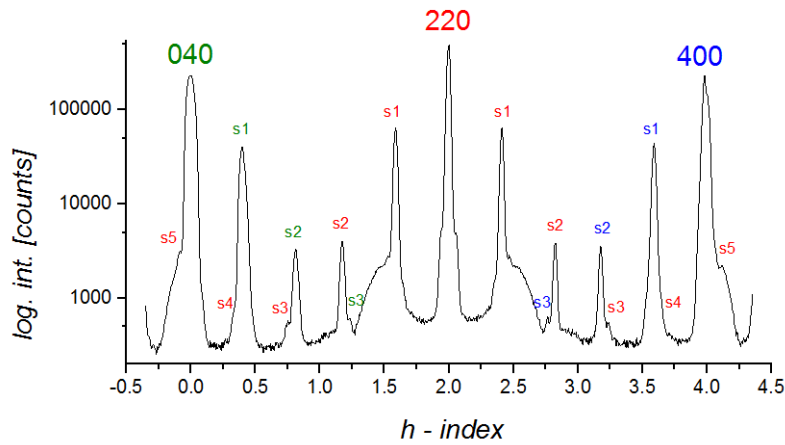


Fig. 1: q-scan in the $[110]^*$ direction measured on the $\text{Ni}_{50}\text{Mn}_{27}\text{Ga}_{22}\text{Fe}_1$ single crystal at the room temperature.