

# The structure and magnetocaloric effect of MnCoGe alloy modified by Nb

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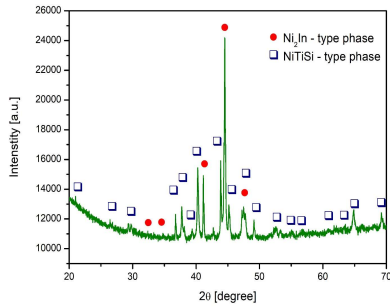


Fig. 1. XRD pattern of the tested alloy

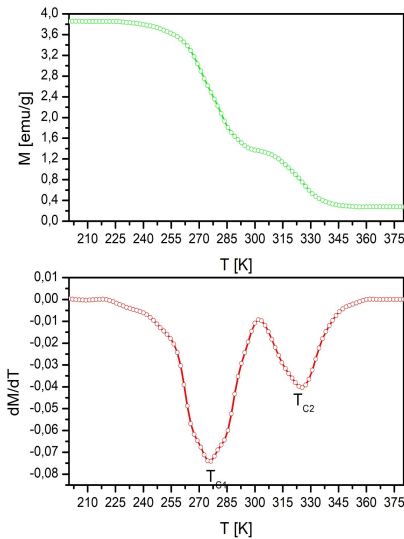


Fig. 2. Top: The relationship between the magnetization of the tested alloy. Bottom: First derivative of magnetization

The analysis of the dependence of magnetization on temperature revealed two Curie temperatures which are **275** and **325K**

Table 1. Lattice parameters of phases detected in the investigated alloy.

Phase	Lattice parameter		
	a [Å]	b [Å]	c [Å]
Ni <sub>2</sub> In	5.877	3.524	6.981
NiTiSi	5.463	3.989	6.994

## Conclusions

- This article examines the structure and thermomagnetic properties of the Mn<sub>0.9</sub>Nb<sub>0.1</sub>CoGe alloy.
- XRD tests of the material as cast at room temperature revealed the existence of two orthorhombic structures.
- The relationship between the magnetization and its first derivative showed two Curie points corresponding to the identified phases.
- Two overlapping peaks, corresponding to the two detected Curie points, were also measured depending on the temperature of the change in magnetic entropy.

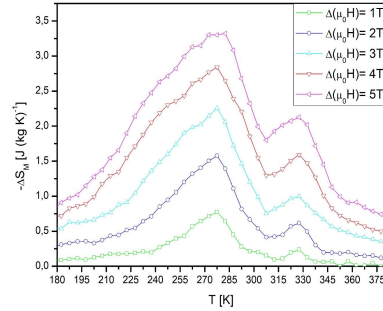


Fig. 3. The  $\Delta S_M$  vs. T curve measured in various external magnetic fields

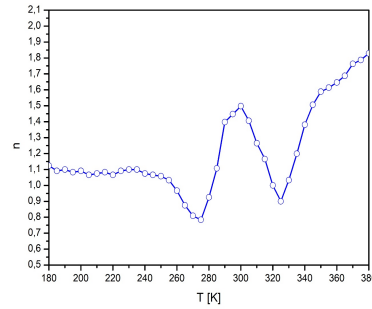


Fig. 4. Temperature dependence n calculated for the mean-field model

Table 2. The values of  $T_C$ ,  $\Delta S_M$  and RC revealed for all investigated samples

Mn <sub>0.9</sub> Nb <sub>0.1</sub> CoGe			
$\mu_0 H$	$T_{C1}=275$ [K]	$T_{C2}=325$ [K]	RC
[T]	$\Delta S_{M1}$	$\Delta S_{M2}$	[J kg <sup>-1</sup> ]
	[J (kg K) <sup>-1</sup> ]	[J (kg K) <sup>-1</sup> ]	
1	0.77	0.24	36.77
2	1.58	0.62	100.72
3	2.26	0.99	173.59
4	2.84	1.59	232.09
5	3.30	2.13	307.60