

Supporting Information for:

Kinetics and the effect of the thermal treatments on the martensitic transformation and magnetic properties in the $\text{Ni}_{49}\text{Mn}_{32}\text{Ga}_{19}$ ferromagnetic shape memory ribbons

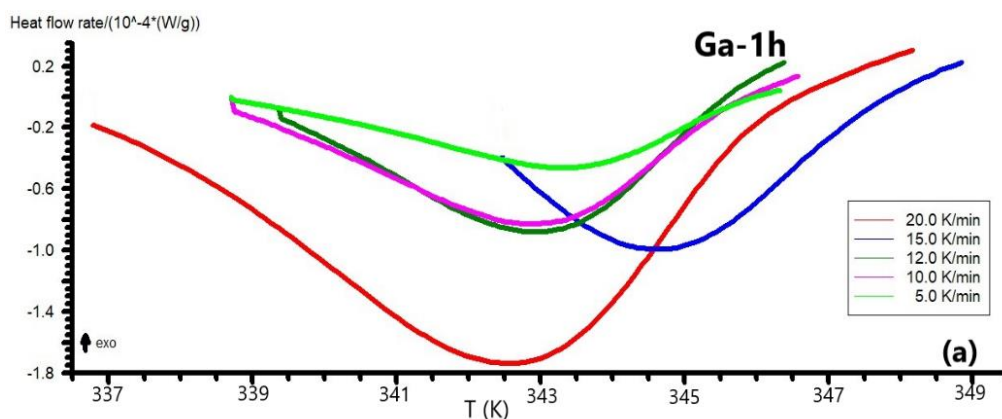
Felicia Tolea¹, Bogdan Popescu¹, Cristina Bartha¹, Monica Enculescu¹, Mugurel Tolea¹ and Mihaela Sofronie^{1,*}

¹National Institute of Materials Physics, Atomistilor 405A, 077125 Magurele, Romania

*Correspondence: mihsof@infim.ro (M.S.)

Abstract: In our work, the kinetics of the martensitic transformation and the influence of the thermal treatments on the martensitic transformation and the related magnetic properties of the $\text{Ni}_{49}\text{Mn}_{32}\text{Ga}_{19}$ ferromagnetic shape memory melt-spun ribbons have been investigated. Thermal treatments at 673K for 1, 4 and 8 hours can be considered an instrument for fine-tuning the performance parameters of the alloys. The one-hour thermal treatment promotes an improvement of the crystallinity of these otherwise highly textured ribbons, reducing internal defects and stress induced by the melt-spinning technique. Longer thermal treatments induce an important magnetization rise concomitantly with a slight and continuous increase of the martensitic temperatures and transformation enthalpy. The activation energy, evaluated from the DSC experimental data with a Friedman model, significantly increases after thermal treatments as a result of the multi-phase coexistence and stabilization of the non-modulated martensitic phase, which increases the reverse martensitic transformation hindrance.

Keywords: kinetics, ferromagnetic shape memory alloys, melt-spun ribbons, martensitic transformations



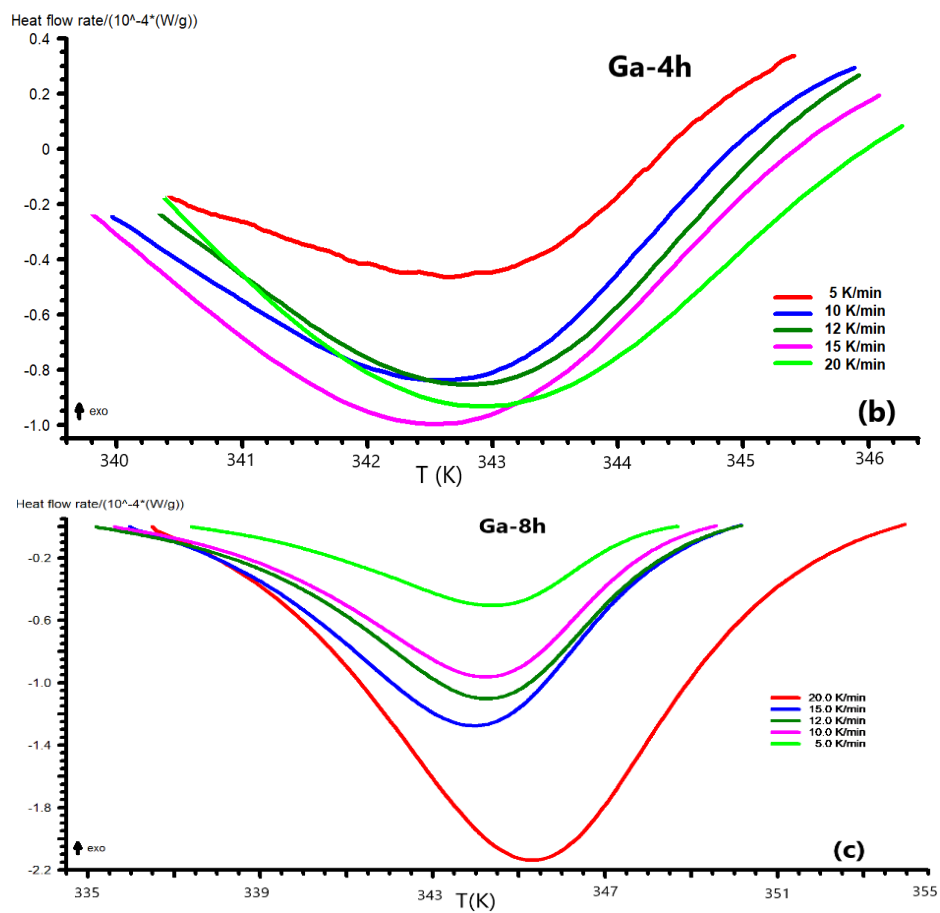
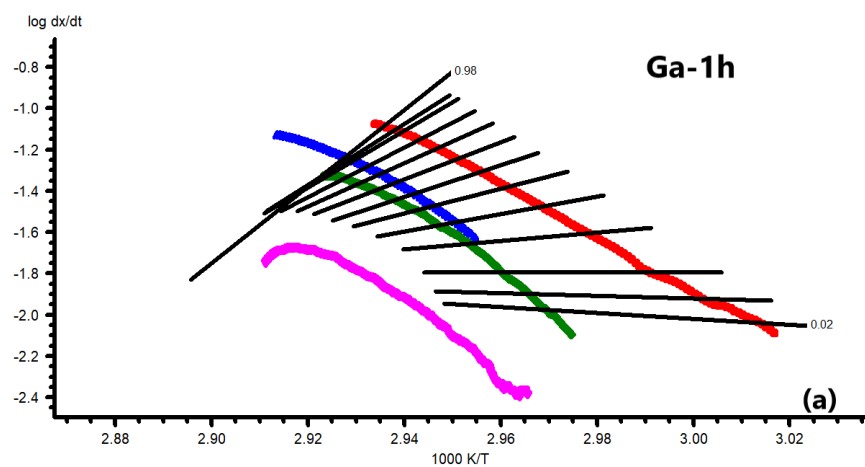


Figure S1 DSC curves at the different heating rates (5, 10, 12, 15, 20 K/min) for the Ga-1h (a), Ga-4h (b), and Ga-8h (c) sample, respectively



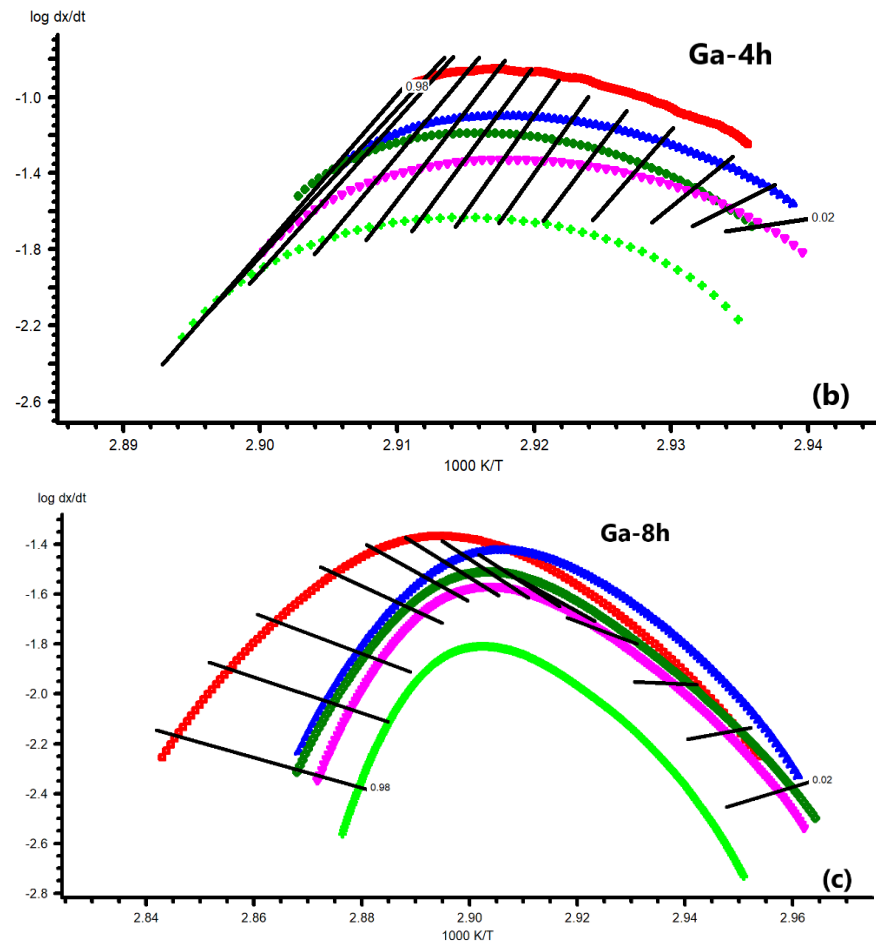


Figure S2 The $1/T$ dependence of $\log d\alpha/dt$ according to the Friedman model for the Ga-1h (a), Ga-4h (b), and Ga-8h (c) sample, respectively