

# **EFFECT OF AGING ON MICROSTRUCTURE AND MARTENSITIC TRANSFORMATION AND MAGNETIC PROPERTIES OF NI GA FE TI SHAPE MEMORY ALLOY**

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## **ABSTRACT**

The effect of ageing on the microstructure, martensitic transformation and magnetic and mechanical properties of Ni<sub>51</sub>Fe<sub>18</sub>Ga<sub>27</sub>Ti<sub>4</sub> shape memory alloy was investigated. There are five specimens of this alloy aged at 573 up to 973K for 3 h per each. This range of ageing temperature greatly affects the microstructure of investigated alloys. As the ageing temperature increases from 573K up to 973 K, the microstructure of Ni<sub>51</sub>Fe<sub>18</sub>Ga<sub>27</sub>Ti<sub>4</sub> alloy gradually changed from entirely martensitic matrix at 573K to fully austenitic microstructure at 973K. The volume fraction of precipitated Ni<sub>3</sub>Ti particles increased with increasing ageing temperature from 573K up to 773K. Further increasing in ageing temperature up to 973K decreased the percentage of Ni<sub>3</sub>Ti in the microstructure. Martensitic transformation temperature was decreased steadily by increasing ageing temperature. The magnetization saturation, remnant magnetization and coercivity increased with ageing temperature up to 773K. Further increase in ageing temperature decreases these magnetic properties. Moreover, hardness measurements was gradually increased at first by increasing ageing temperature up to 773K then dramatically decreased to the lowest value at 973K.

**KEYWORDS:** Magnetic Shape Memory Alloys, Ageing, Microstructure, Martensitic Transformation, Magnetic and Mechanical Properties