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INVESTIGATION OF THE STABILITY STATES AMORPHOUS OF THE BINARY Zr62Ni38 SYSTEM THROUGH THE ELECTRICAL RESISTANCE AS A FUNCTION OF TEMPERATURE

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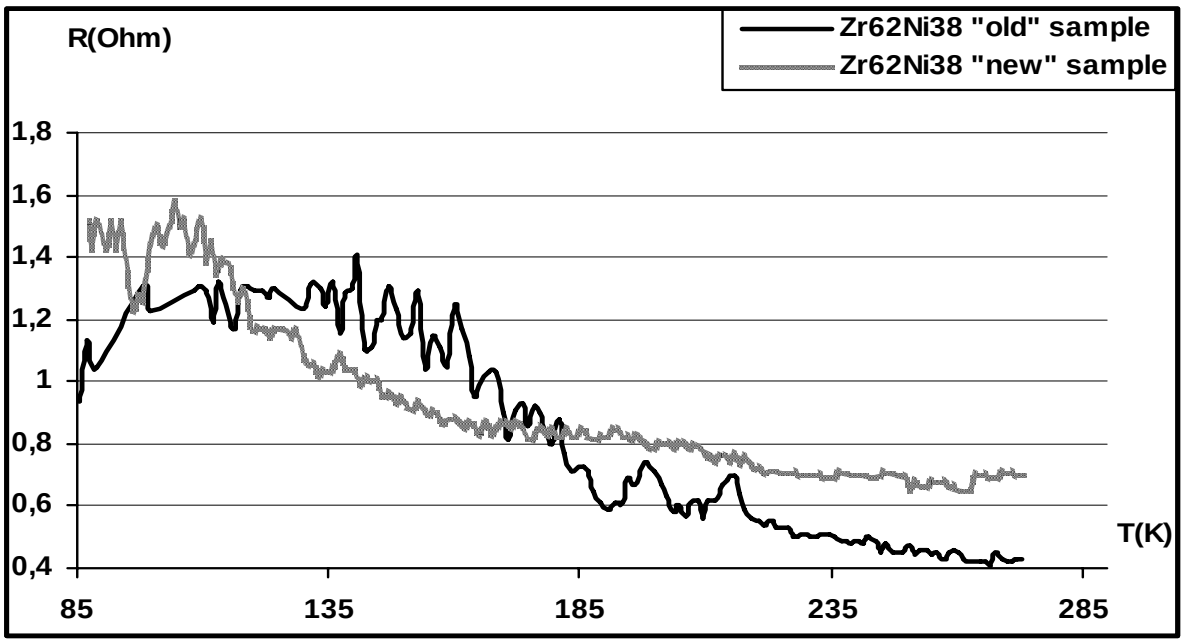
ABSTRACT
In this paper was researched the stability amorphous states of the binary Zr62Ni38 system, which was obtained 20 years ago, by investigation dependence of electrical resistance on the temperature.The obtained results were compared with results which was obtained at the moment of the same composition.
The „old" sample and the „new" sample was relaxed at temperature 573K for 5 hours. After that, the temperature dependence on the magnetic susceptibility was investigated and the obtained results were compared.
The tests were conducted in temperature range from 85K to 280K by investigation the temperature dependence of electrical resistance.
The research is fundamental, i.e. belongs to physics of the solid state and physics of metals.
The obtained results are graphically presented.
Keywords: Amorphous Metallic Alloys, Electrical Resistance, Phase Transition

1. INTRODUCTION
An amorphous metallic ribbon Zr62Ni38 (Zr: 62 at. %; Ni: 38 at. %) was produced twenty years ago in the Laboratory for metal physics. At these time, the samples with the same chemical composition are produced using vacuum arc furnace with melt-spinning method. The dependence of the electrical resistance on the temperature was investigated on all samples

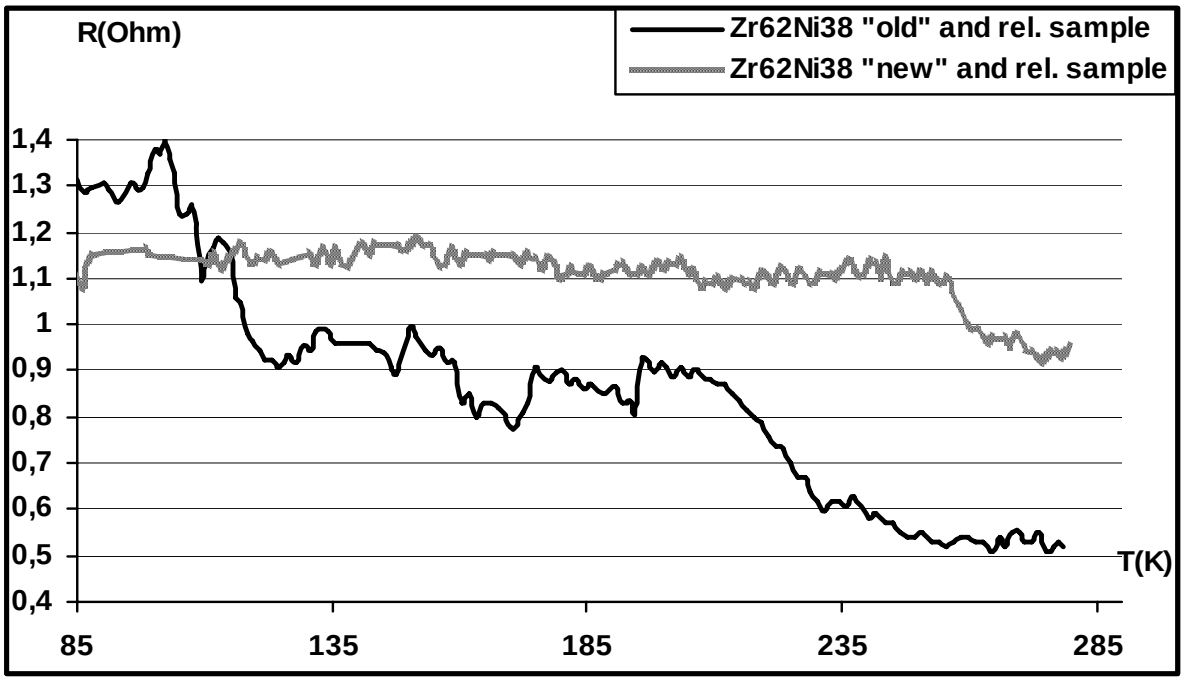
2. EXPERIMENTAL PROCEDURE
First part of the experiment was electrical resistance investigation both non-relaxed „old" and „new" amorphous samples in temperature range between 85K and 573K.
In the second part of the experiment the used samples were heat treated for five hours at 573K. After heat treatment the electrical resistance investigation of the samples were carried out under same condition as described in first part of the experiment.

3. RESULTS AND DISCUSSION

Analyzing the collected data that are presented on the Figure 1, the following could be concluded:



a)



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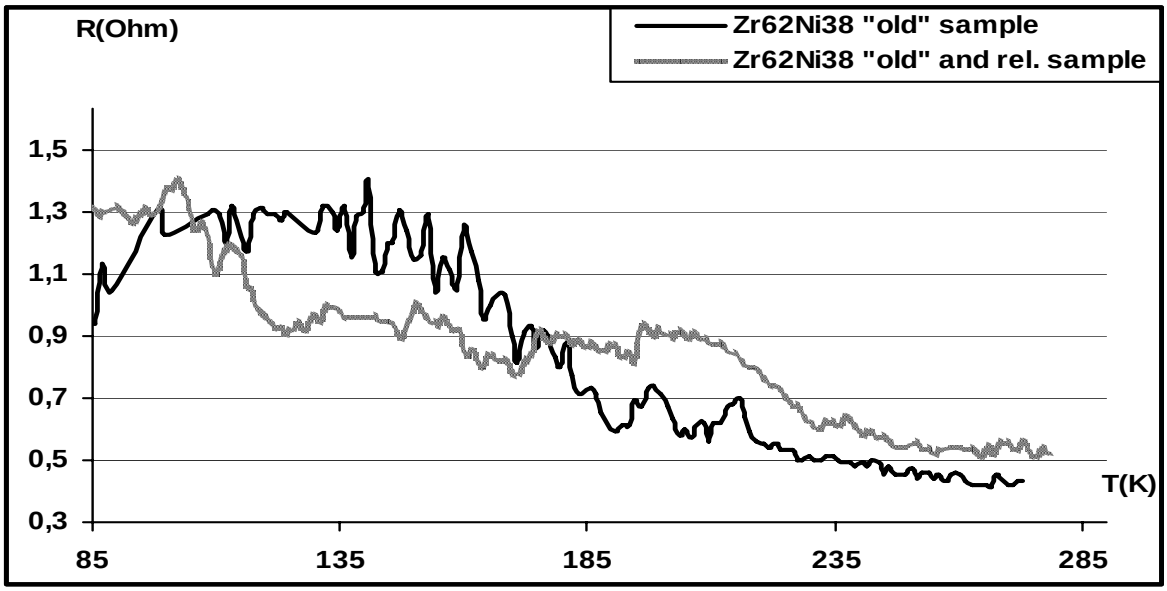

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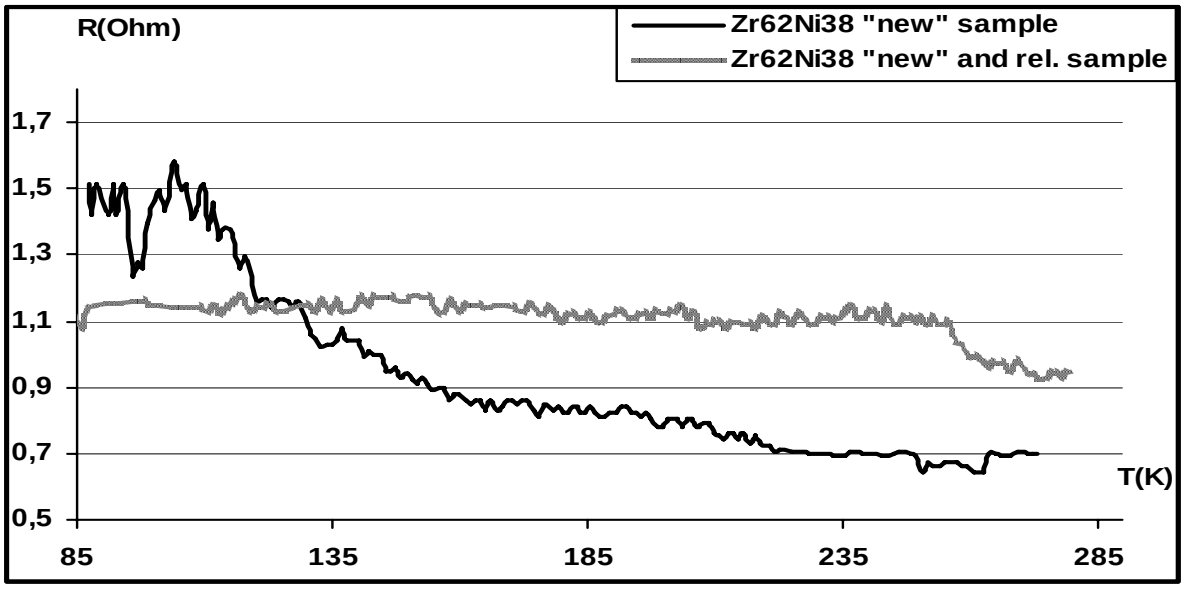

d)

Figure 1. Electrical resistance in amorphous and relaxed systems as a function of temperature (rel.-relaxed)

1. The samples, even after twenty years of aging, have amorphous structure and electrical resistance is decreased with increasing temperature, fig. 1a).
2. The average value of electrical resistance both „old“ and “new“ samples is decreased after heat treatment, fig. 1b); the samples still have amorphous structure
3. The average value of the electrical resistance heat treated „old“ samples is lower then electrical resistance of the not-heat treated samples in temperature range between 85 K and 180 K but in the temperature range between 180 K and 280 K the electrical resistance of the heat treated samples is higher than not- heat treated samples.
4. The average value of the electrical resistance heat treated „new“ samples is lower

then electrical resistance of the not-heat treated samples in temperature range between 85 K and 130 K but in the temperature range between 130 K and 280 K the electrical resistance of the heat treated samples is higher than not- heat treated samples, fig. 1d).

4. REFERENCES

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