

Preparation of Ni-Ti Shape Memory Alloy by Spark Plasma Sintering Method

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This paper aims to describe powder metallurgy methods of production Ni-Ti shape memory alloy - self-propagating high-temperature synthesis (SHS) and spark plasma sintering (SPS). There are compared microstructures and phase compositions of alloys produced by SHS and by a technology containing SHS, milling and SPS. At the same time there is determined the influence of the SPS sintering temperature on the structure of Ni-Ti alloy. Self-propagating high-temperature synthesis was initiated at 1100°C with process duration 20 minutes the heating rate of approx. 300 °C/min. The product is highly porous and contains undesirable Ti₂Ni phase. The SPS technique allows to obtain product with low porosity. The disadvantages of SPS technique are growing amount of Ti₂Ni phase and formation of other undesirable phases (Ni₄Ti₃ and Ni₃Ti).

Keywords: powder metallurgy, reactive sintering, spark plasma sintering, Ni-Ti alloy

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