Preparation and Characterization of NiTi Shape Memory Alloy Preparedby Powder Metallurgy

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Some perspective materials are characterized by shape memory effect and NiTi alloy belongs to their main representatives. NiTi is an approximately equiatomic alloy of nickel and titanium and it possesses interesting properties, such as superelasticity, pseudoplasticity and good corrosion resistance. Hence, it is used in different branches of industry (aerospace, medicine, engineering etc.). Common manufacturing melting methods of this alloy are vacuum arc remelting (VAR) and vacuum induction melting (VIM) methods. However, these methods have some disadvantages. The VAR process must be repeated several times to achieve sufficient homogeneity of manufactured ingots. During the VIM process the melt can be contaminated by carbon originated from graphite crucible. Therefore, powder metallurgical methods have been extensively investigated in last years as an alternative to the common processes. In this work, NiTi samples were prepared by the thermale xplosion mode of self-propagating high-temperature synthesis (TE-SHS). Chemical and phase composition, as well as microstructure and hardness of the prepared samples were studied. Afterwards, the samples were heat treated and the influence of the annealing on the studied characteristics was investigated.

Keywords: NiTi alloy, powder metallurgy, SHS

Acknowledgement
The authors would like to thank to the Czech science foundation (project no. P108/12/G043).

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Paper number: M201461