
Plasma Immersion Ion Implantation technique in NiTi SMA produced by powder metallurgy

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Abstract

The NiTi SMA has excellent mechanical properties as such shape memory recovery when deformed beyond its elastic limit, either by heating (shape memory effect) or by applied load release (pseudoelastic effect). This type of material has been produced by SMA/ITA group using two processes "Vacuum Induction Melting (VIM) and" Electron Beam Melting (EBM). Currently are studying whether the possibility of using the porous NiTi, produced by powder metallurgy, especially for biomedical applications. However, some studies indicate that this material has the possibility of nickel release, a carcinogenic element, which causes the human body rejects and allergic reactions A possibility of reduction or even elimination of the release is the surface modification, which can be accomplished by various methods such as plasma and laser treatment, ion implantation by plasma immersion. The purpose of the work is analyzed the efficiency of N-PIII technique in NiTi alloys produced by powder metallurgy. The samples are used with 10 mm diameter 3 mm thickness produced from elemental powders of Ti and Ni. The powders were mixed and compressed (2T) and sintered at temperatures 800-1100°C for varying the porosity. The samples will be processed in NPIII varying the range and the time of implantation. It's will be analyzed by SEM to evaluate the behavior of porosity and the martensitic transformation temperatures by DSC.

Keywords: NiTi SMA, PBII, powder metallurgy

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