

## Experimental Investigation on Effect of Different Heat Treatments on Phase Transformation and Superelasticity of NiTi Alloy

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**Abstract :** NiTi alloys possess magnificent superelastic, shape memory, high strength and biocompatible properties. For improving mechanical properties, foremost, superelasticity behavior, heat treatment process is carried out. In this paper, two different heat treatment methods were undertaken: (1) solid solution, and (2) aging. The effect of each treatment in a constant time is investigated. Five samples were prepared to study the structure and optimize mechanical properties under different time and temperature. For measuring the upper plateau stress, lower plateau stress and residual strain, tensile test is carried out. The samples were aged at two different temperatures to see difference between aging temperatures. The sample aged at 500 °C has a bigger crystallite size and lower amount of Ni which causes the mentioned sample to possess poor pseudo elasticity behaviour than the other aged sample. The sample aged at 460 °C has shown remarkable superelastic properties. The mentioned sample's higher plateau is 580 MPa with the lowest residual strain (0.17%) while other samples have possessed higher residual strains. X-ray diffraction was used to investigate the produced phases.

**Keywords :** heat treatment, phase transformation, superelasticity, NiTi alloy

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