

Author's Accepted Manuscript

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PII: S0921-5093(18)31098-0
DOI: <https://doi.org/10.1016/j.msea.2018.08.041>
Reference: MSA36812

To appear in: *Materials Science & Engineering A*

Received date: 15 July 2018
Revised date: 9 August 2018
Accepted date: 12 August 2018

Cite this article as: Xiaobin Shi, Hongliang Yang, Hu Mao, Yongtao Li, Junsong Zhang and Xiaohui Yin, Effect of plastic deformation of V nanowires on the transformation characteristics of NiTiV alloys, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2018.08.041>

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Effect of plastic deformation of V nanowires on the transformation characteristics of NiTiV alloys

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Abstract

The effect of plastic deformation of V nanowires on the transformation characteristics of two NiTiV alloys was investigated. A significant increase of B19'→B2 transformation temperatures in the deformed samples during the initial heating process was found. In the subsequent cooling process, the R→B19' transformation temperatures were higher than the as-annealed samples. Upon second heating, the B19'→R transformation temperatures were higher than the as-annealed samples, but the change was much smaller than the R→B19' transformation. All of these phenomena are closely related to the plastic deformation of V nanowires during deformation.

Keywords: plastic deformation; martensitic transformation; V nanowires; residual internal stress; DSC analysis

Introduction

As shape memory alloys, NiTiNb alloys exhibit not only higher strength (critical transformation stress) but also wider hysteresis than pure NiTi shape memory alloys. For this reason, they have been used in aeronautic and aerospace engineering [1-4]. Niobium plays an important role on improving the performance of NiTiNb alloys largely due to its wide hysteresis [2-4]. It was reported recently that the

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