

## Document details

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[Full Text](#) [View at Publisher](#)

AIP Conference Proceedings

Volume 2068, 6 February 2019, Article number 020003

International Conference on X-Rays and Related Techniques in Research and Industry 2018, ICXRI 2018; Grand Riverview HotelKota Bharu, Kelantan; Malaysia; 18 August 2018 through 19 August 2018; Code 144871

## Effect of annealing on surface oxidation of Ti-50.8 at% Ni shape memory alloy (Conference Paper)

Sholihin, M.H.M. [✉](#), Zaki, H.H.M. [✉](#), Sarifuddin, N. [✉](#), Hairin, A.L.N. [✉](#) [👤](#)

Department of Manufacturing and Materials Engineering, Kulliyah of Engineering, International Islamic University Malaysia, Jalan Gombak, Selangor, Malaysia

### Abstract

[View references \(8\)](#)

Nowadays, the used of NiTi shape memory alloys in biomedical field is growing exponentially linear with technological advancement. With all great benefits from NiTi, however, they also come with certain level of toxicity that can harm human's health sourcing from the Ni itself. Many techniques have been developed to contain this Ni from leaching out from the NiTi shape memory alloys. Among the techniques, thermal oxidation via annealing treatment is chosen where  $TiO_2$  is expected to form on the surface of the NiTi shape memory alloys and may act as a barrier to prevent the Ni from leaching out. Therefore, this research investigates the effect of annealing treatment to produce the optimum thickness of the oxide layer with good martensitic transformation behavior. In this case, NiTi was annealed from 400 °C to 700 °C for duration of 10 to 300 minutes in a furnace. The thickness of oxide layer was characterized using SEM and the transformation behavior was analyzed using DSC equipment. Based on the results obtained from SEM and DSC, by increasing annealing temperature and time, the thickness of the oxide layer increases and more even, however, it reduces the enthalpy change. Therefore, samples annealed at 600 °C for 50 to 150 minutes is an optimum parameter to produce the appropriate thickness and uniformity of the oxide layer (~22 - 26- $\mu$ m) with reasonable  $M_s$  and enthalpy changes ( $\Delta H_{A \rightarrow M} = 7.50$  to 9.62). © 2019 Author(s).

### SciVal Topic Prominence ⓘ

Topic: Shape memory effect | Corrosion resistance | Ion implantation

Prominence percentile: 88.919 ⓘ

ISSN: 0094243X

ISBN: 978-073541796-0

Source Type: Conference Proceeding

Original language: English

DOI: 10.1063/1.5089302

Document Type: Conference Paper

Volume Editors: Ahmad Z.A., Mohamed J.J., Sulaiman M.A.

Publisher: American Institute of Physics Inc.

### References (8)

[View in search results format >](#) All [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)

### Metrics ⓘ

0 Citations in Scopus

0 Field-Weighted Citation Impact

PlumX Metrics [v](#)

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

### Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)[Set citation feed >](#)

### Related documents

Biocompatibility evaluation of domestically-manufactured NiTi-alloys after thermal oxidation of surface

Ding, Z.-R. , Qin, Y.-W. (2007) *Academic Journal of Second Military Medical University*

High voltage anodisation of a NiTi shape memory alloy

Kawakita, J. , Hassel, A.W. , Stratmann, M. (2006) *ECS Transactions*

High voltage pulse anodization of a NiTi shape memory alloy

Kawakita, J. , Stratmann, M. , Hassel, A.W. (2007) *Journal of the Electrochemical Society*

View all related documents based on references

Find more related documents in Scopus based on:

[Authors >](#)