Accepted Manuscript

Title: Reaction-assisted diffusion bonding of Ti6Al4V alloys with Ti/Ni nanostructured multilayers

Authors: Ying Ma, Hong Li, Linpai Yang, Anming Hu

PII: S0924-0136(18)30237-1
DOI: https://doi.org/10.1016/j.jmatprotec.2018.05.035
Reference: PROTEC 15784

To appear in: *Journal of Materials Processing Technology*

Received date: 12-2-2018
Revised date: 31-5-2018
Accepted date: 31-5-2018

Please cite this article as: Ma Y, Li H, Yang L, Hu A, Reaction-assisted diffusion bonding of Ti6Al4V alloys with Ti/Ni nanostructured multilayers, *Journal of Materials Processing Tech.* (2018), https://doi.org/10.1016/j.jmatprotec.2018.05.035

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Reaction-assisted diffusion bonding of Ti6Al4V alloys with Ti/Ni nanostructured multilayers

Ying Ma[1], Hong Li*[2], Linpai Yang[2] and Anming Hu*[1, 3]

[1] Institute of Laser Engineering, Beijing University of Technology, 100 Pingle Yuan, Chaoyang District, Beijing 100124, P. R. China

[2] College of Materials Science and Engineering, Beijing University of Technology, 100 Pingle Yuan, Chaoyang District, Beijing 100124, P. R. China

[3] Department of Mechanical, Aerospace and Biomedical Engineering, University of Tennessee Knoxville, 1512 Middle Drive, Knoxville, TN 37996, USA

*corresponding authors: hongli@bjut.edu.cn; ahu3@utk.edu

Tel: +86-010-67396559

Abstract

The Ti and Ni alternating layers were deposited onto the base materials by magnetron sputtering. Ti/Ni multilayers with different stoichiometries of Ti and Ni were investigated. The joining processes were performed at 800°C for 60 min under pressure of 5-15 MPa. The microstructures of the interface and the mechanical performances were assessed. Reliable joints can be obtained successfully with all three multilayers with different Ti/Ni ratios. A higher pressure and higher Ni content in the multilayers contributed to a higher shear strength. The highest shear strength of 160 MPa was achieved for the joint under 15 MPa using Ti/Ni multilayers with the stoichiometry ratio of Ti/Ni of 1:3, the hardness of the joint was 6.9 GPa. The intermediate phases appeared to be combinations of hard intermetallics frequently occurred in the Ti-Ni binary system.

Key words: Ti/Ni multilayers; reaction-assisted diffusion bonding; titanium alloy.

Download English Version:

https://daneshyari.com/en/article/7176183

Download Persian Version:

https://daneshyari.com/article/7176183

Daneshyari.com