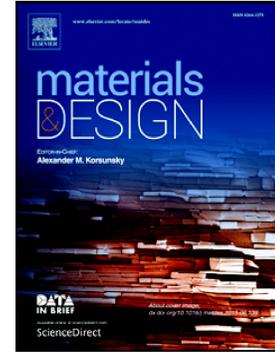


Accepted Manuscript

Study of TLP bonding of Ti-6Al-4V alloy produced by vacuum plasma spray forming and forging

Akbar Davoodi, Hamid Reza Salimijazi, Hossein Edris, Javad Mostaghimi



PII: S0264-1275(17)30181-8
DOI: doi: [10.1016/j.matdes.2017.02.046](https://doi.org/10.1016/j.matdes.2017.02.046)
Reference: JMADE 2786
To appear in: *Materials & Design*
Received date: 13 December 2016
Revised date: 31 January 2017
Accepted date: 15 February 2017

Please cite this article as: Akbar Davoodi, Hamid Reza Salimijazi, Hossein Edris, Javad Mostaghimi, Study of TLP bonding of Ti-6Al-4V alloy produced by vacuum plasma spray forming and forging. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. *Jmade*(2017), doi: [10.1016/j.matdes.2017.02.046](https://doi.org/10.1016/j.matdes.2017.02.046)

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.

Study of TLP bonding of Ti-6Al-4V alloy produced by Vacuum Plasma Spray Forming and Forging

Akbar Davoodi^{a1}, Hamid Reza Salimijazi^a, Hossein Edris^a, Javad Mostaghimi^b

^aDepartment of Materials Engineering, Isfahan University of Technology, Isfahan 84156-83111, Iran

^bCenter for Advanced Coating Technologies, University of Toronto, Toronto, CAD, M5S3G8

ABSTRACT

Due to the nature of the near-net-shape formed of Ti-6Al-4V alloy produced by vacuum plasma spray forming (VPSF), post-deposition heat treatment is necessary to achieve to the superior mechanical and physical properties. In this study, transient liquid phase (TLP) bonding of VPSF and forging Ti-6Al-4V alloy were investigated. Simultaneous joining process under equi-axed α phase heat treatment cycle was performed to achieve to a suitable microstructure and mechanical properties of both bonding area and parent metal. Different thicknesses of 2, 5, 10, and 25 μm copper interlayer were used and the effect of the interlayer thickness was evaluated. Results showed that the joint region was wider in the TLP bonded VPSF alloy compared to the forged alloy under the same bonding conditions because of the higher diffusion rates in the VPSF alloy. The highest bonding shear strength was achieved for 2 μm interlayer thickness. It was 452 and 492 MPa for the TLP bonded VPSF and forged alloy, respectively. Increasing the interlayer thickness resulted in decreasing the bonding strength and increasing the hardness of the joint area due to the existence of Ti_2Cu intermetallic compounds. The fracture analysis showed the brittle behavior due to the existence of the intermetallic compounds.

Keywords

Transient liquid phase bonding, Ti-6Al-4V alloy, Vacuum plasma spray forming, Forging, Isothermal solidification, Mechanical properties.

¹ Corresponding author. Tel: +989139303196

E-mail address: a.davodi@ma.iut.ac.ir (A. Davoodi)

Download English Version:

<https://daneshyari.com/en/article/5023504>

Download Persian Version:

<https://daneshyari.com/article/5023504>

[Daneshyari.com](https://daneshyari.com)