

Author's Accepted Manuscript

Effect of hydrogen addition on diffusion bonding behavior of Ti-55 alloy

Huiping Wu, Heli Peng, Xifeng Li, Jun Chen



PII: S0921-5093(18)31401-1
DOI: <https://doi.org/10.1016/j.msea.2018.10.032>
Reference: MSA37027

To appear in: *Materials Science & Engineering A*

Received date: 11 May 2018
Revised date: 7 October 2018
Accepted date: 8 October 2018

Cite this article as: Huiping Wu, Heli Peng, Xifeng Li and Jun Chen, Effect of hydrogen addition on diffusion bonding behavior of Ti-55 alloy, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2018.10.032>

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 galley proof before it is published in its final citable 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.

Effect of hydrogen addition on diffusion bonding behavior of Ti-55 alloy

Huiping Wu^a, Heli Peng^b, Xifeng Li^{a*}, Jun Chen^a

^aDepartment of Plasticity Technology, School of Materials Science and Engineering, Shanghai Jiao Tong University, Shanghai 200030, China

^bShanghai Spaceflight Precision Machinery Institute, Shanghai 201600, China

*Corresponding author. X.Li, A/Prof., Ph.D., Tel.: +86 21 62830509; fax: +86 21 62826575; lixifeng@sjtu.edu.cn (X.Li)

Abstract

The mechanism of hydrogen-induced void closure during diffusion bonding (DB) process of hydrogenated Ti-55 alloy with different hydrogen contents at different temperatures has been investigated. When bonded at 700 °C, bonding ratio and shear strength prominently improve with the increase of hydrogen content, which results from residual hydrogen in bonded sample. Hydrogen can increase the fractions of high angle grain boundaries (HAGBs) and β phase as well as break up original long-strip α grains. However, hydrogen almost escapes from hydrogenated alloy when bonded at 800 °C. Then bonding ratio and shear strength slightly increase with increasing hydrogen content. It attributes to grain refinement and volume fraction increase of β phase. Therefore, residual hydrogen plays a key role in improving diffusion bonding properties during DB process.

Keywords: Ti-55 alloy; diffusion bonding; hydrogenation; grain boundary diffusion

1. Introduction

Download English Version:

<https://daneshyari.com/en/article/12055133>

Download Persian Version:

<https://daneshyari.com/article/12055133>

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