## Accepted Manuscript

Microstructural evolution and mechanical properties in the partial transient liquid phase diffusion bonding of tungsten to steel

Yunzhu Ma, Wentan Zhu, Qingshan Cai, Wensheng Liu, Xinkuan Pang

PII: S0263-4368(18)30028-3

DOI: https://doi.org/10.1016/j.ijrmhm.2018.02.002

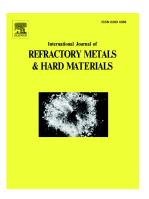
Reference: RMHM 4662

To appear in: International Journal of Refractory Metals and Hard Materials

Received date: 12 January 2018 Accepted date: 3 February 2018

Please cite this article as: Yunzhu Ma, Wentan Zhu, Qingshan Cai, Wensheng Liu, Xinkuan Pang, Microstructural evolution and mechanical properties in the partial transient liquid phase diffusion bonding of tungsten to steel. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Rmhm(2017), https://doi.org/10.1016/j.ijrmhm.2018.02.002

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** 

Microstructural evolution and mechanical properties in the partial

transient liquid phase diffusion bonding of tungsten to steel

Yunzhu Ma, Wentan Zhu, Qingshan Cai \*, Wensheng Liu, Xinkuan Pang

State Key Laboratory of Powder Metallurgy, Central South University, Changsha 410083, PR China

**ABSTRACT** 

The paper describes the design and examination of Ti/Cu double interlayer to produce a

joint between tungsten and steel. Partial transient liquid phase diffusion bonding was

performed by a double stage bonding process. To join tungsten to steel, the brazing of

steel to a Cu interlayer (500 µm) was carried out at 1050 °C followed by transient liquid

phase diffusion bonding to tungsten using an active Ti interlayer (25  $\mu m$ ) at 1000  $^{\circ}$ C.

Microstructural evolution was studied at different bonding times (5, 15, 30, 60 and 180

min) to reveal the diffusion behavior of Ti atom in the interfacial zone between W and

Cu. With the increase of the bonding time, the inserted active Ti interlayer and the

formed Ti-Cu base intermetallic phases tend to be molten and consumed by the formed

liquid alloy in the W-steel joint, while the tensile strength of the joint increases. The

strength of the bonded specimens is as high as 412 MPa at the bonding time of 180 min.

This technique provides a reliable method of bonding W to steel.

Keywords: Tungsten; Partial transient liquid phase bonding; Microstructure; Tensile

strength.

\* Corresponding author.

E-mail address: caiqingshan@csu.edu.cn, cai2009pm@163.com (Q. Cai).

1

## Download English Version:

## https://daneshyari.com/en/article/7989619

Download Persian Version:

https://daneshyari.com/article/7989619

<u>Daneshyari.com</u>