

Accepted Manuscript

Friction stir brazing of 6061 aluminum alloy and H62 brass: Evaluation of microstructure, mechanical and fracture behavior

Guoqiang Huang, Xiaomei Feng, Yifu Shen, Qixian Zheng, Pengcheng Zhao

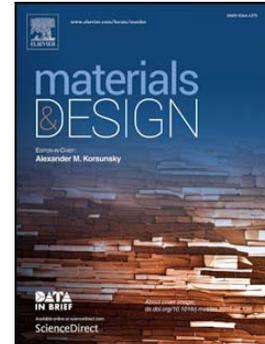
PII: S0264-1275(16)30375-6
DOI: doi: [10.1016/j.matdes.2016.03.094](https://doi.org/10.1016/j.matdes.2016.03.094)
Reference: JMADE 1572

To appear in:

Received date: 14 January 2016
Revised date: 16 March 2016
Accepted date: 17 March 2016

Please cite this article as: Guoqiang Huang, Xiaomei Feng, Yifu Shen, Qixian Zheng, Pengcheng Zhao, Friction stir brazing of 6061 aluminum alloy and H62 brass: Evaluation of microstructure, mechanical and fracture behavior, (2016), doi: [10.1016/j.matdes.2016.03.094](https://doi.org/10.1016/j.matdes.2016.03.094)

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.



Friction stir brazing of 6061 aluminum alloy and H62 brass: Evaluation of microstructure, mechanical and fracture behavior

Guoqiang Huang, Xiaomei Feng, Yifu Shen*, Qixian Zheng, Pengcheng Zhao
College of Materials Science and Technology, Nanjing University of Aeronautics and
Astronautics (NUAA), Yudao Street 29, 210016 Nanjing, PR China
Correspondence to: Yifu Shen (yfshen_nuaa@hotmail.com)

Abstract

In this study, friction stir brazing (FSB) was applied to join 6061 aluminum to H62 brass with the aid of zinc foil. The thermal history of interface was measured by thermocouple. The interfacial microstructure variations under different welding speeds were analyzed via scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS). Additionally, an overlap shearing test was conducted to evaluate the influences of welding speeds on the failure loads of corresponding FSBed joints. Furthermore, typical sound joint was evaluated by peel test to investigate the effect of zinc foil on the fracture behavior and the diffusion reaction products on both aluminum and brass side. The results reveal that the change of traveling speed has significant effect on the thickness of interlayer as well as the cooling rate, but little on the peak temperature. Besides, the maximum failure load can be achieved as high as 7.62KN at rotational speed of 1800 rpm and the traveling speed of 60 mm/min, respectively. Worthy of note is that the presence of zinc foil has a more positive effect on joint strength, which may be possibly attributed to more Cu-Zn intermetallic compounds (IMCs) formed at aluminum side instead of the appearance of more harmful Al-Cu IMCs.

Keywords: Friction stir brazing; Aluminum; Brass; Thermal history; Failure load; Intermetallic compounds

1. Introduction

In recent years, dissimilar joints have been increasingly applied in power generation, military uses, and electrical industries due to their technical and economic advantages [1-6]. The typical case was the joining between aluminum (Al) and brass (Br). On the one hand, both of these two alloys are excellent candidates for heat transfer systems and electrical applications due to their specific properties such as

Download English Version:

<https://daneshyari.com/en/article/7218407>

Download Persian Version:

<https://daneshyari.com/article/7218407>

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