

# Author's Accepted Manuscript

Two-pass Friction Stir Welding of Aluminum alloy to Titanium alloy: A Simultaneous Improvement in Mechanical Properties

Amlan Kar, Satyam Suwas, Satish V. Kailas



PII: S0921-5093(18)30982-1  
DOI: <https://doi.org/10.1016/j.msea.2018.07.057>  
Reference: MSA36721

To appear in: *Materials Science & Engineering A*

Received date: 29 April 2018  
Revised date: 15 July 2018  
Accepted date: 16 July 2018

Cite this article as: Amlan Kar, Satyam Suwas and Satish V. Kailas, Two-pass Friction Stir Welding of Aluminum alloy to Titanium alloy: A Simultaneous Improvement in Mechanical Properties, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2018.07.057>

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.

# Two-pass Friction Stir Welding of Aluminum alloy to Titanium alloy: A Simultaneous Improvement in Mechanical Properties

*Amlan Kar<sup>1\*</sup>, Satyam Suwas<sup>2</sup>, Satish V. Kailas<sup>1</sup>*

<sup>1</sup>*Department of Mechanical Engineering,*

<sup>2</sup>*Department of Materials Engineering,*

*Indian Institute of Science, Bengaluru-560012 India.*

*\*Corresponding author: amlankar@iisc.ac.in*

## Abstract:

During Friction Stir Welding (FSW) of aluminum (Al 2024) to titanium (Ti-6Al-4V), it is observed that titanium fragments at the interface get distributed in the weld nugget. These particles are both coarse and fine in size. Such a particle distribution, particularly due to presence of coarse particles, is expected to negatively impact the mechanical properties of the welds. In an effort to further fragment the coarse Ti particles, FSW was performed with an additional pass in the weld nugget region. Characterization was done using X-ray Micro-Computed Tomography (XCT), Scanning Electron Microscope (SEM) equipped with an Energy Dispersive Spectrometer (EDS), X-ray Diffraction and Electron Back-scattered Diffraction (EBSD) method. Tensile tests were performed to determine the mechanical properties of the weld. The Ti particles of various shapes and sizes were seen to be inhomogeneously distributed in the weld nugget even after the second pass. A detailed observation revealed that the larger particles (as flakes) were inhomogeneously distributed but the finer particles (more spherical) were homogeneously distributed in the weld nugget.

Download English Version:

<https://daneshyari.com/en/article/7971619>

Download Persian Version:

<https://daneshyari.com/article/7971619>

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