

Accepted Manuscript

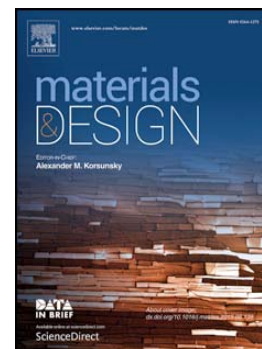
Microstructural evolution and pitting corrosion behavior of friction stir welded joint of high nitrogen stainless steel

H. Zhang, D. Wang, P. Xue, L.H. Wu, D.R. Ni, Z.Y. Ma

PII: S0264-1275(16)31111-X  
DOI: doi: [10.1016/j.matdes.2016.08.048](https://doi.org/10.1016/j.matdes.2016.08.048)  
Reference: JMADE 2201

To appear in:

Received date: 9 May 2016  
Revised date: 3 August 2016  
Accepted date: 14 August 2016



Please cite this article as: H. Zhang, D. Wang, P. Xue, L.H. Wu, D.R. Ni, Z.Y. Ma, Microstructural evolution and pitting corrosion behavior of friction stir welded joint of high nitrogen stainless steel, (2016), doi: [10.1016/j.matdes.2016.08.048](https://doi.org/10.1016/j.matdes.2016.08.048)

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.

## Microstructural evolution and pitting corrosion behavior of friction stir welded joint of high nitrogen stainless steel

H. Zhang, D. Wang, P. Xue, L.H. Wu, D.R. Ni, Z.Y. Ma\*

Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, 72 Wenhua Road, Shenyang 110016, China

### Abstract

With the achievement of sound joints of high nitrogen stainless steel via friction stir welding, significant microstructural changes take place in various regions of the joints. This would bring out the change in the corrosion properties of the joints. In this study, the corrosion behavior of friction stir welded joint of high nitrogen stainless steel was investigated using electrochemical and immersion tests. No drastic decrease in breakdown potentials was observed in the heat affected zones with number and size distribution densities of pits being similar to that in the base metal. The nugget zone exhibited a relatively good pitting corrosion resistance, mainly attributing to the breakup of coarse inclusions and grain refinement during welding. The  $\delta$ -ferrite bands and tool wear exerted no obvious effects on the corrosion behavior of the welded joint due to the lack of Cr diffusion.

**Keywords:** High nitrogen stainless steel; friction stir welding; pitting corrosion; microstructure

### 1. Introduction

High nitrogen stainless steel (HNS), as a relatively new kind of engineering material, has gained more and more attention, due to the favorable mechanical and corrosion properties.

---

\* Corresponding author. Tel./Fax: +86-24-83978908. E-mail address: zyma@imr.ac.cn (Z.Y. Ma)

Download English Version:

<https://daneshyari.com/en/article/7217921>

Download Persian Version:

<https://daneshyari.com/article/7217921>

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