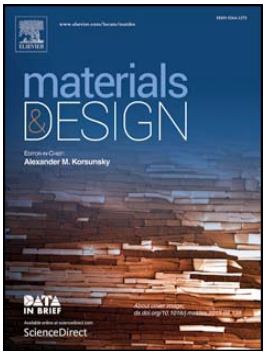

Microstructural evolution and pitting corrosion behavior of friction stir welded joint of high nitrogen stainless steel

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PII: S0264-1275(16)31111-X
DOI: doi: 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

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

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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 δ-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.

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