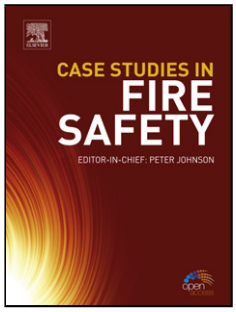

Title: Effect of Sliding Conditions on Micropitting Behaviour of AISI 304 Stainless Steel in Chloride Containing Solution

Authors: Y. Sun, R. Bailey

PII: S0010-938X(18)30295-6
DOI: https://doi.org/10.1016/j.corsci.2018.05.004
Reference: CS 7516

To appear in:

Received date: 12-2-2018
Revised date: 27-4-2018
Accepted date: 4-5-2018

Please cite this article as: Sun Y, Bailey R, Effect of Sliding Conditions on Micropitting Behaviour of AISI 304 Stainless Steel in Chloride Containing Solution, *Corrosion Science* (2010), https://doi.org/10.1016/j.corsci.2018.05.004

Effect of Sliding Conditions on Micropitting Behaviour of AISI 304 Stainless Steel in Chloride Containing Solution

Y. Sun*, R. Bailey

School of Engineering and Sustainable Development
Faculty of Technology
De Montfort University
Leicester LE1 9BH, UK

* Corresponding author: Email: ysun01@dmu.ac.uk; Tel: (44) 116 2577072

Highlights

- Micropits tends to form in the sliding track in the NaCl containing solution at potentials below the pitting potential.
- There exists a combination of contact load, frequency and sliding time for micropits to form.
- Size and number of micropits increase with increasing load, frequency and sliding time.
- At excessively high load and frequency, micropits disappear from the sliding track.

ABSTRACT

The tribo-electrochemical behaviour of AISI 304 austenitic stainless steel in 0.5 M NaCl solution is investigated at an anodic potential of 70 mV(SCE) under controlled sliding and electrochemical conditions. It is found that at such an anodic potential where corrosion pits do not form without sliding, numerous micro-pits are found inside the sliding tracks under certain sliding conditions. There exists a critical combination of frequency, load and sliding duration for the development of the pits. The results are discussed considering the accumulation of mechanical damages induced by sliding and the competition between wear and pit growth during the process.

Keywords: Stainless steel; Pitting corrosion; Potentiostatic; Sliding wear; Tribocorrosion