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TMS 2020 149th Annual Meeting & Exhibition Supplemental Proceedings pp 1341-1348 | Cite as

Comparative Assessment of the Fracture Behaviour of API-5L X65 and Micro-alloyed Steels in E80 Simulated Fuel Ethanol Environment

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Conference paper

First Online: 12 February 2020

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Part of the The Minerals, Metals & Materials Series book series (MMMS)

Abstract

Monotonic J-integral tests were carried out on API-5L X65 steel and micro-alloyed steel (MAS) in E80 simulated fuel grade ethanol (SFGE) environment using three-point bend specimens. A ramp rate of 10–04 mm/s was used for loading in each sequence so as to enhance stress corrosion cracking (SCC) influence if any. The influence of the SFGE environment on tearing resistance and fracture toughness of the steels was studied. Both steels exhibited decrease in fracture toughness in E80 in relation to air. The decrease in fracture toughness may be due to anodic dissolution at the crack tip. Ductile tearing resistance of the steels increased in E80 due to decline in toughness property. In comparison with X65 steel, MAS showed better fracture properties.

Keywords

J-integral Fracture SFGE E80 Steels

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Notes

Acknowledgements

The authors acknowledge the Council for Scientific and Industrial Research, India and The World

Academy of Sciences, Italy, for funding this work. Covenant University is acknowledged for open access funding.

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<https://doi.org/10.1002/9783527641789.ch1>

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Cite this paper as:

Joseph O.O., Sivaprasad S., Tarafder S., Ajayi J.A. (2020) Comparative Assessment of the Fracture Behaviour of API-5L X65 and Micro-alloyed Steels in E80 Simulated Fuel Ethanol Environment. In: The Minerals, Metals & Materials Society (eds) TMS 2020 149th Annual Meeting & Exhibition Supplemental Proceedings. The Minerals, Metals & Materials Series. Springer, Cham

First Online

12 February 2020

DOI

https://doi.org/10.1007/978-3-030-36296-6_124

Publisher Name

Springer, Cham

Print ISBN

978-3-030-36295-9

Online ISBN

978-3-030-36296-6

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