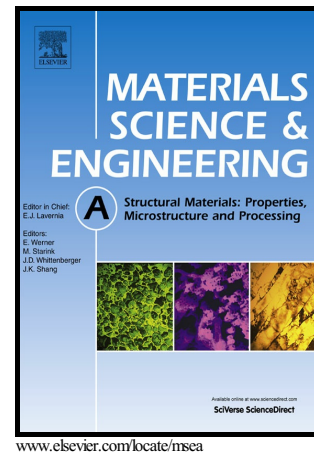


# Author's Accepted Manuscript

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PII: S0921-5093(16)31178-9  
DOI: <http://dx.doi.org/10.1016/j.msea.2016.09.098>  
Reference: MSA34183

To appear in: *Materials Science & Engineering A*

Received date: 26 August 2016  
Revised date: 21 September 2016  
Accepted date: 23 September 2016

Cite this article as: Damien texier, Jonathan Cormier, Patrick Villechaise, Jean-Charles Stinville, Chris J. Torbet, Stéphane Pierret and Tresa M. Pollock, Crack initiation sensitivity of wrought direct aged alloy 718 in the very high cycle fatigue regime: the role of non-metallic inclusions, *Materials Science & Engineering A*, <http://dx.doi.org/10.1016/j.msea.2016.09.098>

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# Crack initiation sensitivity of wrought direct aged alloy 718 in the very high cycle fatigue regime: the role of non-metallic inclusions

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## Abstract

Fatigue crack initiation in the direct aged version of the nickel-base superalloy Inconel 718 has been investigated at room temperature in the low stress/very high cycle regime via ultrasonic fatigue testing. Three different microstructures have been examined at the same strain amplitude in order to understand the influence of non-metallic inclusions (NMIs), i.e. carbides, carbonitrides and nitrides, and  $\Sigma 3$  twin boundary density on lifetime and failure mode. A slight refinement in grain structure and a higher  $\Sigma 3$  twin boundary density is associated with substantial reductions in lifetime. Decreasing  $\Sigma 3$  twin

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