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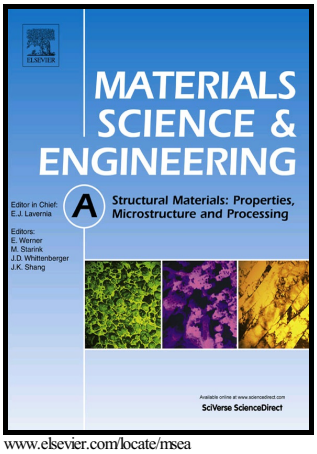

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Micro-morphology of Fatigue Crack Initiation and Propagation Behavior in High Strength Aluminum Alloy

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Abstract

The microscopic morphology of fatigue crack initiation and propagation behavior was investigated for B93пч high strength aluminum using optical microscopy, scanning electron microscopy and transmission electron microscopy. The results show that, the fatigue micro-crack generally initiates on the surface from broken coarse particle, interface between particle and matrix and grain boundary. The micro-crack initiation has the characteristics of randomness and diversity and the main crack is generally formed on the surface of the specimen. Fatigue crack propagation path may deviate from the direction with the max loading and appear in the form of deflection, fork, convergences and bridge connectivity. This can be attributed to the influence of microstructural characteristics, which also affect the fatigue crack propagation direction and growth rate.

Key words: high strength aluminum alloy; crack propagation; crack deflection; bridge connectivity

1. Introduction

B93пч high strength aluminum alloy in this study can match with the 7075 (United States), widely applied in aerospace, military, transportation and other fields due to the characteristics of low density, high strength and hardness and good processability, which has become one of the