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## Grain boundary engineering of large-size 316 stainless steel via warm-rolling for improving resistance to intergranular attack

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### Abstract:

A new thermomechanical processing of warm rolling by a low deformation followed by annealing, which was specially developed for grain boundary (GB) engineering of large-size materials, was performed on a large-size 316 stainless steel. To examine usefulness of the thermomechanical process, the GB-networks before and after this process were quantitatively compared, and intergranular attack susceptibility was measured. Results clearly demonstrate that the GB-engineered 316 has higher proportions of coincidence site lattice boundaries, larger grain-clusters, longer twin boundary chains, and lower susceptibility to intergranular attack, indicating a successful process for GB-engineering. Additionally, a new parameter called twin boundary chain was proposed to evaluate the GB-network optimization.

### Keywords:

316 stainless steel; Grain boundary engineering; Microstructure; Grain boundaries; Twin boundary chain

### 1. Introduction

Intergranular attack (IGA) can occur in austenitic stainless steels served in

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