Influence of Heat-treatment sequence on retained Austenite reversion and Microstructural Evolution in thin-section of MDN 250 Maraging Steel

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ABSTRACT

Maraging steels are a class of low-carbon, high-strength alloys that are widely used in the defense and aerospace industries due to their exceptional strength and toughness. MDN 250 grade maraging steel responds exceptionally well to heat treatment due to the intermetallic phases that form within a martensitic matrix. Understanding the phase transformation behavior and microstructural evolution of thin-section (1.5 mm) MDN 250 maraging steel under various heat-treatment cycles is the aim of this work. The study aims to analyse the change from martensitic to retained austenitic structures and the subsequent stabilization of the microstructure under different thermal conditions. It is highlighted how structural homogeneity, phase balance, and grain evolution are related to heat-treatment parameters.

The results are expected to provide insight into the phase stability and transformation mechanisms in thin-section maraging steels. The results will aid in the optimization of thermal processing pathways for lightweight aerospace components that demand remarkable strength, toughness, and dimensional stability.