

## Modelling the Growth of $\sigma$ -Phase in AISI 347H FG Steel

**Authors :** Yohanes Chekol Malede

**Abstract :**  $\sigma$ -phase has negative effects on the corrosion responses and the mechanical properties of steels. The growth of  $\sigma$ -phase in the austenite matrix of AISI 347H FG steel was simulated using DICTRA software using CALPHAD method. The simulation work included the influence of both volume diffusion and grain boundary diffusion. The simulation results showed a good agreement with the experimental findings. The simulation results revealed a Cr-depleted and a Ni-enriched  $\sigma$ -phase/austenite interface. Effects of temperature, grain size, and composition of alloying elements on the growth kinetics of  $\sigma$ -phase were assessed. The simulated results were fitted to the JMAK equation and a good correlation was obtained.

**Keywords :** AISI 347H FG austenitic steel, CALPHAD, sigma phase, microstructure evolution

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