

# Microstructural changes during solution and aging heat-treatments of MAR-M246 superalloy

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Solution and aging heat-treatments play a key role for the application of the superalloys. The aim of this work is to evaluate the microstructure of the MAR-M246 nickel-based superalloy solutioned at 1200 and 1250°C for 330 min and aged at 780, 880 and 980 °C for 5, 20 and 80 h. The  $\gamma'$  solvus, solidus and liquidus temperatures were calculated with the aid of the JMatPro software (Ni database). The as-cast and heat-treated samples were characterized by SEM/EDS and SEM-FEG. The  $\gamma'$  size precipitated in the aged samples was measured and compared with JMatPro simulations. The results have shown that the sample solutioned at 1250°C for 330 min showed a very homogeneous  $\gamma$  matrix with carbides and cubic  $\gamma'$  precipitates uniformly distributed. The mean  $\gamma'$  size of aged samples at 780 and 880 °C for 5, 20 and 80 h did not present significant differences when compared to the solutioned sample. However, a significant increasing in the  $\gamma'$  particles was observed at 980 °C, evidenced by the large mean size of these particles after 80 h of aging heat-treatment.