

Decomposition and Phase Precipitation effects on Mechanical Properties near-eutectoid Ti-Cu Alloy

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Abstract

Alloys in the Ti-Cu system with compositions close to the eutectoid exhibit potential for structural applications, because they present interesting mechanical properties, low density and high corrosion resistance. The mechanical behavior of these alloys depends directly on the processing conditions and heat treatments applied. Under equilibrium conditions, the microstructure of these alloys is formed by the α phase and the Ti_2Cu intermetallic compound. Depending on the processing conditions imposed, metastable structures may be formed. The aim of this study was evaluate the mechanical properties of the near eutectoid Ti-Cu alloys after aging heat treatment. Initially, the specimens were solution treated at 1,000 °C and followed by water quenching (~150 °C/s). Some of the specimens were then aged at a non-isothermal condition with a heating rate of 10 °C/minute until achieve at 400 °C, 500 °C and 600 °C followed by WQ. The heat treatments results suggest that the maximum values of mechanical strength correspond to the loss of coherence between the Ti_2Cu intermetallic compound precipitates and the α phase matrix.

Keywords: Ti-Cu Alloys, Phase Transformation, Mechanical Properties.