

PENGARUH PERLAKUAN PANAS TERHADAP STRUKTUR MIKRO DAN SIFAT-SIFAT MEKANIK PADA PADUAN TiAl

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ABSTRAK

This study investigates mechanical properties and behavior of cast, non-hot isostatic pressed (non-HIPed) Ti-48Al intermetallic alloy, in the as-cast and heat treated conditions. Different types of microstructures obtained through heat treatments were examined. In the as-cast condition, the microstructure is nearly fully lamellar. This microstructure consists of alternating α and β - laths and small amounts of single-phase β - TiAl. Lamellar colony size is approximately 238 μm in diameter and 115 μm for single-phase β grains. One of heat treatment employs soaking at 1200 $^{\circ}\text{C}$ for 120 minutes followed by water quench producing a 'duplex' microstructure. This microstructure consists of lamellar colonies, 439 μm in diameter and equiaxed β grains of 219 μm in diameter. Another heat treatment at 1400 $^{\circ}\text{C}$ for 240 minutes followed by furnace cooling to low temperature yields a fully lamellar microstructure. The microstructure consists of large size lamellar colonies with diameter of more than 1000 μm . Microvickers hardness measure for α and β phase in the as-cast alloy are 256 Hv and 213 Hv, respectively. The β phase and lamellar colonies in the duplex structure display microvickers hardness value of 224 Hv and 285 Hv, respectively. The nearly fully lamellar and duplex microstructures have comparable strength of 631.8 MPa and 630.8 MPa, respectively. The fracture strain is also similar at 1.07 % and 1.1 %, respectively. Bending stiffness for nearly fully lamellar is lower than duplex microstructure at 163.6 GPa and 186.6 GPa, respectively.