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An Analysis of the Effects of Process, Structure, and Properties on the Performance of the Ti6Al4V Alloy

Brad Jay Sampson
Mississippi State University, bs1875@msstate.edu

Loubna Ifqir
Mississippi State University, li86@msstate.edu

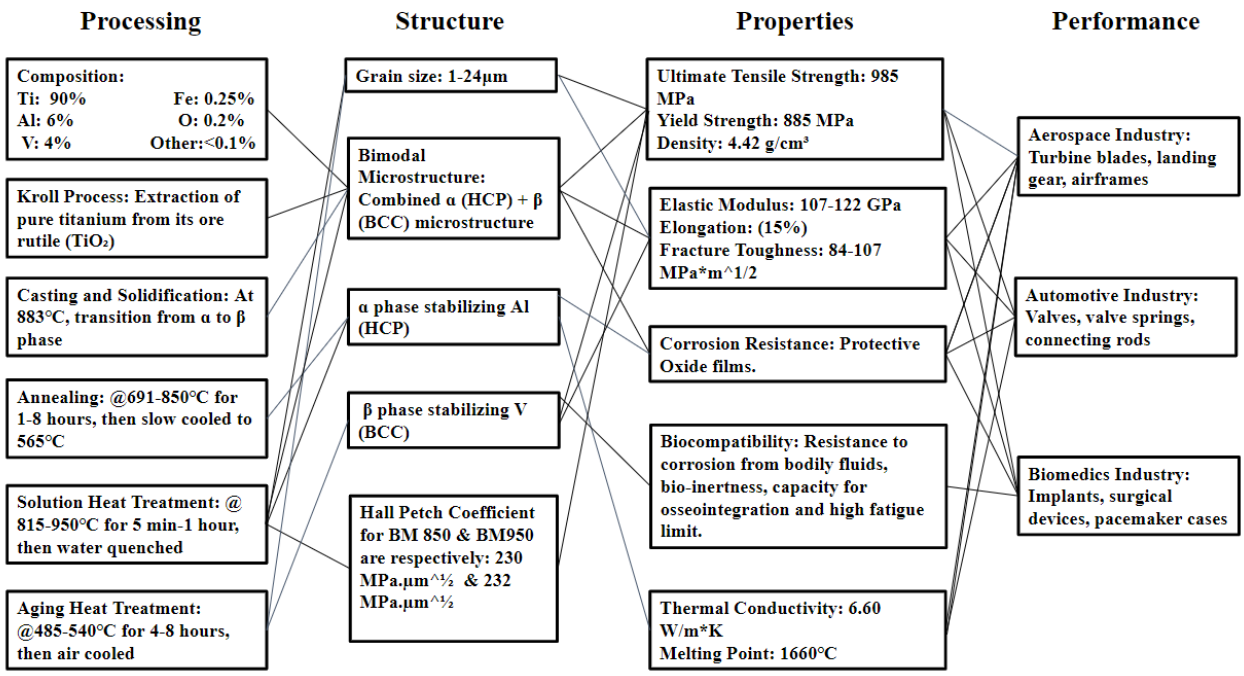
Ti6Al4V Alloy Review

Loubna Ifqir and Brad Sampson
Department of Mechanical Engineering, Mississippi State University

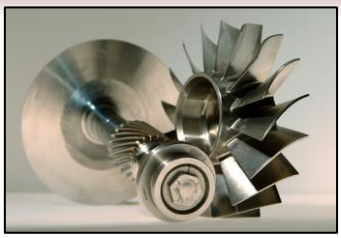
Introduction

Ti6Al4V (pronounced Ti-64), is a titanium alloy used in a variety of engineering applications including the aerospace, automotive, and biomedical industries. Ti6Al4V is made up of a combined α-β microstructure, which provides it with many valuable properties such as high strength, low weight, high melting point, corrosion resistance, and biocompatibility.

Processing- Structure- Properties- Performance Map



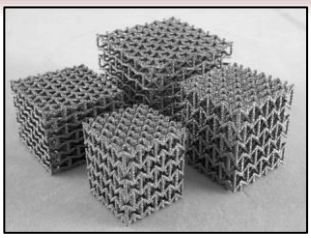
Applications



Aerospace

Automotive

Biomedical



Additive Manufacturing

PSPP Relationship

The Processing-Structure-Properties-Performance chart is a road map summarizing the behavior of Ti6Al4V. Pure titanium is extracted through the Kroll process, where it can exist as a complete α phase (HCP) at temperatures below 883°C and a complete β phase (BCC) above this temperature. The microstructure is heat treatment dependent, but the addition of V improves the biocompatibility, strength and fatigue life, while the addition of Al enhances the corrosion resistance. These properties are what makes Ti6Al4V the perfect candidate for applications in the aerospace, automotive, and biomedical industries.