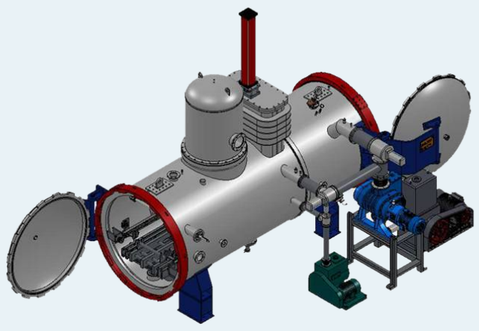
December 2021

Ti-6Al-7Nb Utilization in Surgical Implants

Michael O. Fleming
mf1464@msstate.edu

Ti-6Al-7Nb



Process

Several impactful processing techniques exist in industry. Some of these processes for curating Ti-6Al-7Nb are:

1. Conventional processes/forging
2. Superplastic Deformation
3. Vacuum Hot Pressing
4. Oxygen Diffusion Hardening
5. Thermohydrogen Processing

Structure

Varied processing techniques of Ti-6Al-7Nb can provide improved microstructures in a few key ways:

1. Controlling grain size
2. Controlling a colony size
3. Oxygen interstitial atoms near the surface
4. Temporary hydrogen diffusion

Properties

Ti-6Al-7Nb properties can be improved in the following regimes through processing technique and control of microstructure:

1. Yield and fatigue strength
2. Ductility
3. Surface hardness
4. Friction coefficient
5. Corrosion resistance

Performance

This alloy provides superior performance for surgical implants. Ti-6Al-7Nb has great biocompatibility due to a TiO_2 surface layer, wear performance, and fatigue performance. It's currently an optimal choice amongst materials for long-lasting, high-performing implants.