Mongraph

SINTERED TITANIUM ALLOYS

Authors: Dušan Božić, Jelena Stašić, Višeslava Rajković*

The development of aviation and automotive industries, marine and space techniques and chemical industry, led to the application of titanium and titanium alloys in the foreground. Titanium alloys have a high ratio of strength / density, good mechanical properties at elevated temperatures and excellent corrosion properties. However, as production of special alloys requires special conditions of melting and special ways of processing and recycling processes of primary metals are not simple, these alloys are expensive compared to other metals. The high cost of these materials, except for expensive raw materials, influences and corresponding machining. This problem now can be reduced by applying new technologies and production of composite materials based on titanium. The technology that has significantly expanded the application of titanium and its alloys is powder metallurgy, whose technique has enabled obtaining high-quality sintered and composite products.

In the monograph is shown the state of research in recent decades of sintered titanium alloys, with the focus on the most popular commercial Ti6Al4V alloy.

Monograph consists of five chapters in which 13 tables and 46 images are presented.

The basic characteristics of different types of titanium alloys, titanium alloys transformation, formation of suitable phases in the structure of titanium after the slow and rapid cooling, precipitation processes, forging and strengthening in the appropriate phase fields, as well as thermal processing of titanium alloys are contained in the first chapter.

General characteristics of sintered titanium alloys, different technologies to obtain titanium alloy, and the application of the material are presented in the second chapter.

In the third chapter of the monograph, are presented procedures of obtaining powders of titanium and its alloys with adequate purity, with detail description of two techniques: centrifugal atomization and hydride-de hydride procedure.

Consolidation of titanium alloy powders at room and high temperatures was the subject of analysis in the fourth chapter. Outlined are the basics techniques of compaction of powders of this material with all the characteristics of the products obtained by the procedures of conventional pressing and sintering, cold isostatic pressing and sintering, hot pressing and hot isostatic pressing.

Mechanical, structural and fractural features of sintered Ti6Al4V alloy are explained in the fifth, and the last part of the monograph.

* Contact author: Višeslava Rajković visnja@vinca.rs