APPLICATION**SHEET**

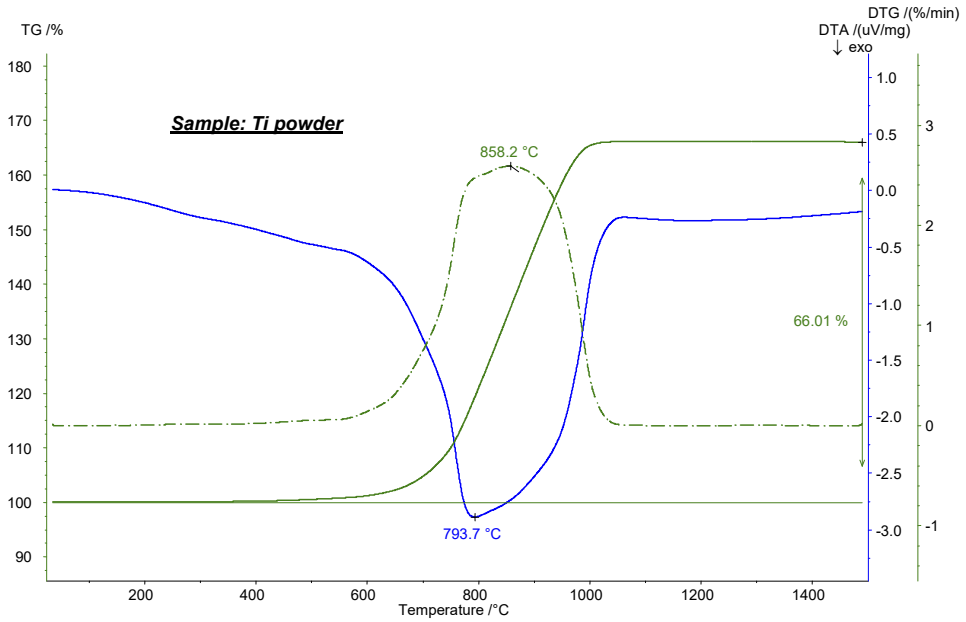
Metals – Aerospace

STA 449 *Jupiter*®-QMS 403 *Aëolos*®

Titanium

Introduction

Titanium is a light lustrous, corrosion-resistant transition metal with white-silvery metallic color. It is often used in steels as alloying element. Because of the high tensile strength to density ratio, corrosion resistance and ability to withstand moderately high temperatures without creeping, titanium alloys are used in aircraft, armor plating, naval ships, spacecraft and missiles. Consumer products like hammer heads, tennis rackets, golf clubs or jewellery can furthermore be made of titanium. Due to its biocompatibility, titanium is used for surgical implements and implants. Fine titanium powder is a source of bright burning with silvery sparks for fireworks. Last but not least, titanium compounds have also very important applications: for example, TiO_2 is a white permanent pigment for paints, paper, etc, and TiN is often used to coat cutting tools such as drill bits.



Test Conditions

Temperature range:	RT ... 1500°C
Heating/cooling rate:	10 K/min
Atmosphere:	synthetic air 70 ml/min
Sample mass:	71.60 mg
Crucible:	Al_2O_3 beaker
Sensor:	TGA-DTA type S

Test Results

The figure depicts the temperature-dependent mass change (TGA), rate of mass change (DTG) and DTA signal. The sample mass increased by 66% with a maximum rate of mass change at 858°C. The DTA signal exhibited an exothermic peak which is typical for oxidation. The mass spectrometer displayed a minimum for mass number 32 which reflects the consumption of O_2 during oxidation (see figure on page 2). Oxidation of titanium leads to an additional protective layer.

NGB · Application Sheet 177 · E · 2020 · Technical specifications are subject to change.

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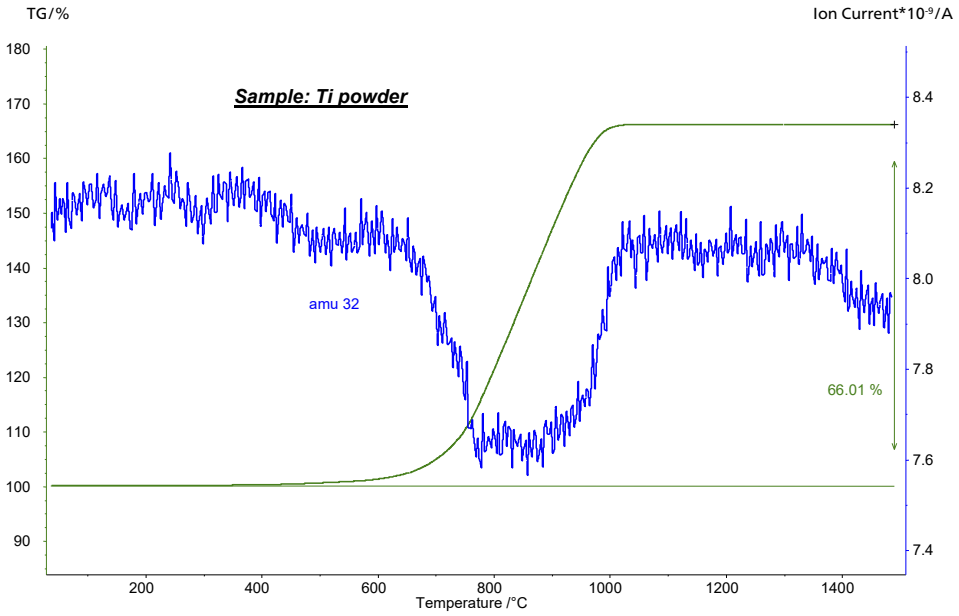

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