The superiority of our integrated production from titanium sponge to titanium powder for Additive Manufacturing

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Presentation overview

1. History of OSAKA Titanium technologies
2. Growing market of titanium powder for Additive Manufacturing (AM)
3. Issues of requirements for titanium powder for Additive Manufacturing (AM)
4. Our approach to issues and our superiority
5. Our approach to the next step
6. Summary
1. History of OSAKA Titanium technologies

History of OSAKA Titanium technologies

1952 Founded
1954 Titanium sponge plant completed
1981 Titanium melting shop completed

1994 World’s first commercialization of titanium powder by the gas atomization method

2002 Titanium sponge production capacity 18 kt/y
2006 Titanium sponge production capacity 24 kt/y
2008 Titanium sponge production capacity 31 kt/y
2011 Titanium sponge production capacity 40 kt/y

The world’s largest class and highest quality titanium sponge plant
- PQ grade
- AS 9100 certified

Stable supply of pure titanium powder for a lot of applications

Plant for titanium alloy powder is under construction to start operation in the beginning of 2020
2. Growing market of titanium powder for Additive Manufacturing (AM)

Increase mainly in aerospace and medical fields in the future

Demand of titanium powder for AM
(AM: Additive Manufacturing)

SmarTech Report (2016)
3. Issues of requirements for titanium powder for Additive Manufacturing (AM)

Requirements in the fields of main applications

<R&D phase → Full-scale mass production phase>

**Aircraft field**
- Guarantee of tungsten (W) free
- Quality standards

**Medical field**
- Reduction in risk of contamination
- Traceability

Cost acceptable by customer is also pursued.
3. Issues of requirements for titanium powder for Additive Manufacturing (AM)

Risk of contamination

To reduce the risk of contamination by high melting point substances including W and foreign matters, control of all the relative processes not only the powder production process is required.

Control from the phase of material is the important point.
3. Issues of requirements for titanium powder for Additive Manufacturing (AM)

Oxygen control

• Oxygen content meeting customers’ needs is required

• Low oxygen is needed to increase the number of reuse times

Reduction in customers’ cost

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Increases in the number of reuse times

Limitation of reuse

Reduction in powder oxygen content

Number of reuse times

0
3. Issues of requirements for titanium powder for Additive Manufacturing (AM)

Oxygen control

• Oxygen content of powder
  ⇒ depends on particle size (specific surface area)

• To control oxygen content
  ⇒ control of ingot is needed.

Control from the phase of material is needed.
4. Our approach to issues and our superiority

Integrated production from material to titanium powder

Superiority of titanium sponge manufacturer
Full control by integrated production
4. Our approach to issues and our superiority

Construction of new plant dedicated for titanium alloy powder

- Stable supply to meet increased demands
- Prevention of contamination by environmental foreign matters and different powder by special plant

- Investment to facilities: US$ 10 million
- Production capacity: 100 t/y
- Scheduled start of operation: Beginning in 2020
- Construction site: At Amagasaki Plant in the Headquarters
- Quality control: W free
  Applicable to aircraft (plans to acquire AS 9100)
As a measure for the problem of increased waste powder with the increase in the use of additive manufacturing technology, OTC have started to approach to the engineering development of reuse by the technology of titanium sponge process.
5. Our approach to the next step

< Further reduction in cost of titanium powder >

Unlike conventional method, unique titanium powder production method without a process handling ingot is under development.
6. Summary

As a titanium sponge manufacturer, we tackle varied issues to supply products stably to the growing market and to meet customer needs by utilizing the new plant as well as the superiority of our integrated production processes for titanium powder.

Thank you for your attention