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OSAKA Titanium technologies Co., Ltd.

Establishment of Titanium Powder Technology for Additive Manufacturing

OSAKA Titanium technologies Co., Ltd. (President: Yasuaki Sugizaki, Headquarters: Amagasaki, Hyogo, hereinafter “OTC”) has recently established titanium powder technology as a technique suited for-additive manufacturing, and plans to strive proactively to expand sales of titanium powder in the future.

1. Additive manufacturing technology

Additive manufacturing is the technology of direct molding of three-dimensional objects from design data, allowing commercial production of parts with complicated shapes, and contributing to drastic streamlining of the manufacturing process as well as to cost reduction.

At present, production of parts through additive manufacturing is attracting considerable attention from the aerospace and medical sectors, the main users of titanium sponge produced by OTC, and active research and development of this technology is underway among domestic and international firms.

<Purpose contemplated for each industrial sector>

- Aerospace sector:
 - Cost reduction of existing parts (to improve material yield)
 - Manufacture of parts with complicated shapes (manufacturing parts with shapes not reproducible by existing methods; integrating multiple parts)

- Medical sector:
 - Manufacture of parts with porous structure (to enhance adhesiveness to human bone)
 - Manufacture of parts with complicated shapes (integration of multiple parts, tailor-made designing)

The titanium products manufactured by this new additive manufacturing technology have only a short track record so far in the aerospace sector, thus presenting a somewhat higher hurdle to clear certification. But just recently, some overseas aerospace part manufacturers have received certification on some of their parts, and have been promoting commercial production and practical application of these parts.

Also, in the medical sector, practical applications for manufacturing product such as artificial hip joint are gradually progressing.

As titanium and titanium alloys present problems such as high price, hard workability, high melting point, etc., utilization of additive manufacturing technology is highly desirable, and demand for titanium powder as the raw material for this application will be expanded in the future.

2. OTC's titanium powder

Over 20 years, OTC has supplied the spherical titanium powder (product name: TILOP), for application in metal injection molding technology (MIM), since OTC started commercial manufacturing and sales of such titanium powder. OTC's titanium powder is manufactured using the (noncontact melting) gas atomizing method, which does not use a crucible for melting and is a manufacturing process characteristic of minimal contamination by impurities, having an annual melting capacity of 150 tons, one of the highest-scale of production in the world.

TILOP, being spherical in shape and with few impurities, has been evaluated by sample testing as suitable for

additive manufacturing at business organizations, universities and research institutions within the country and abroad. In consequence, some of OTC's customers at home and abroad have already established ongoing production of their components using the additive manufacturing method.

On the basis of these practical accomplishments, OTC has successfully established titanium powder technology for additive manufacturing, and are determined to proactively enhance evaluation and marketing by and for OTC's customers, to secure further applications of additive manufacturing technology.

3. Future undertakings

Amongst current available types of additive manufacturing system, there are several systems capable of using titanium powder, but the powder's specifications vary widely; these depend on the characteristics of the systems (such as the melting method, the applicable powder size and the powder supply method), the shape of the target manufacturing component, and the intended end-usage sector (aerospace, medical, general industrial, etc.). Because the technological development of additive manufacturing systems is progressing rapidly, OTC will continue to develop powders to suit future additive manufacturing requirements.

OTC has sustained a track record of more than 60 years as a world-class manufacturer of high quality titanium sponge suitable for the aerospace and medical sectors. Taking advantage of OTC's strength in high quality titanium sponge and the powder manufacturing technologies OTC has cultivated, OTC aims to proactively develop the market for titanium powder for additive manufacturing, both at home and abroad, in response to the varied needs of customers.

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