ABSTRACT

Low Cost Titanium and Innovative Titanium Alloys by Advanced Powder Metal Manufacturing Technology

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This presentation discusses the current commercial applications that employ advanced powder metal technology for the production of near net shape titanium alloy components for military and commercial applications. Significant cost savings are achieved along with realistic delivery schedules for material meeting the standard tensile requirements of CP titanium and titanium alloys. With the price escalation and significantly extended delivery schedules occurring with the supply of ingot metallurgy product, the economic advantage of this advanced powder metal technology is shown to extend beyond near-net shape to the supply of “mill product” billet, bar and plate. The economic advantages of this manufacturing technology, the homogeneous microstructure of the fully dense product and the mechanical properties achieved are reviewed.

In addition, since the consolidation of the powder materials is accomplished by pressing and sintering operations well below the melting point, the process permits the creation of innovative titanium alloy compositions not possible by “ingot” metallurgy. The enhanced mechanical properties of these new alloys and metal matrix composites are discussed.

BIOGRAPHY

About the Speaker

Stanley Abkowitz, CEO of Dynamet Technology, founded Dynamet after his early career in the titanium industry. His work at the Army’s Watertown Arsenal resulted in his development of the Ti-6Al-4V alloy and his work at RMI Titanium resulted in two commercial titanium alloys still in production.

At Dynamet, Mr. Abkowitz pioneered the application of advanced powder metal technology that has resulted in a low cost manufacturing technology for production of preformed titanium shapes and that more recently has enabled the creation of new titanium alloys and composites. Mr. Abkowitz is an inventor or co-inventor of 21 U.S. and foreign patents and is considered a “Master Chef” in the creation of titanium alloys. A 1972 Fellow of ASM International, he received its William Hunt Eisenman Award in 1999. He received the Metal Powder Industries Federation (MPIF) Award for Distinguished Service to Powder Metallurgy and the inaugural Titanium Achievement Award of the International Titanium Association in 2000. In 2005 at its annual meeting in Pittsburgh, Mr. Abkowitz was presented ASM’s Lifetime Achievement Award. A graduate of MIT, Mr. Abkowitz is the author of the first book on titanium, “Titanium In Industry” published in 1955 and of the historical monograph, “The Emergence of the Titanium Industry” published by The Minerals, Metals and Materials Society (TMS) in 1999.