



Conference Programme

Day 1

Friday, 8th September

Grand Ballroom Asia

8:30	Opening Remarks & Welcome by Conference Chair Prof. Huiping Tang	
9:00	Group Photo	
Conference Plenary Talks Chairman: Thomas Ebel		
9:15	Ma Qian	Powder Metallurgy of Titanium and Titanium Alloys: Some Recent Developments and Potential Opportunities
9:45	Masahiko Morinaga	The Molecular Orbital Approach and Its Application to Titanium Alloy Design
10:15	Kechao Zhou	Powder Metallurgy Technology and Industry in China
10:45	Break	
Conference Plenary Talks Chairman: Katsuyoshi Kondoh		
11:00	Z. Zak Fang	Powder Metallurgy of Ti: Past, Present, and Future – A review of PMTi Research in North America
11:30	Orest Ivasishin	Research and Development in Titanium Powder Metallurgy in CIS Countries
12:00	Huiping Tang	Development of Metal Additive Manufacturing in China
12:30	Lunch	

Grand Ballroom Asia A		Grand Ballroom Asia B	
Titanium Powder Metallurgy Processing Chairman: Z. Zak Fang		Additive Manufacturing Chairman: Philipp Surrey	
14:30	Katsuyoshi Kondoh (Keynote) Solid solution strengthened powder metallurgy Ti materials	14:30	Milan Brandt (Keynote) Titanium additive manufacturing research at RMIT
14:55	Chao Yang (Keynote) Semi-solid sintering: a novel processing approach for bimodal titanium alloys	14:55	Ben Jackson (Invited) Additive Manufacturing of TiB reinforced Ti-6Al-4V: Microstructure and Hardness Modification
15:20	Hongzhou Zhang (Oral) An easy-to-debind PEG/polymer Q-based binder system for Ti metal injection moulding: rheological properties and debinding behaviors	15:15	Jingbo Gao (Oral) Microstructure and mechanical properties of Ti-6Al-4V alloy samples fabricated by selective laser melting in conjunction with metal 3D printing
15:35	Liqing Huang (Oral) In-situ TiB and N reinforced titanium matrix composites with a network-woven architecture design	15:30	Peng Cao (Oral) Feasibility of selective electron beam melting of biocompatible NiTi alloy for rapid manufacturing of medical parts
15:50	Dongyang Li (Oral) Liquid Phase Sintering and Inhomogeneous Distribution of Oxygen in Titanium with Rare Earth Elements	15:45	Dong Qiu (Oral) Duplex grain refinement of β -Ti and α -Ti through inoculation
16:05	Break		
Grand Ballroom Asia A		Grand Ballroom Asia B	
Titanium Powder Metallurgy Processing Chairman: Yong Liu		Additive Manufacturing Chairman: Deliang Zhang	
16:25	Ali Yousefiani (Keynote) Powder Metallurgy Titanium alloys: Pathway to Aerospace Applications	16:25	Stefan Gulizia (Keynote) Innovative Titanium Additive Manufacturing Technologies
16:50	Yafeng Yang (Invited) The Controlling of Densification and Oxygen Contamination in Powder Metallurgy Titanium alloys	16:50	Jian Wang (Keynote) Microstructure and mechanical properties of Ti-6Al-4V sheets additively manufactured by selective electron beam melting
17:10	Fei Yang (Invited) Cost-effectively producing high-properties of titanium alloys by powder compact extrusion of elemental powder mixtures	17:15	David H StJohn (Invited) The challenges associated with the formation of equiaxed grains during additive manufacturing of titanium alloys
17:30	Hongzhi Niu (Oral) Low-cost high-quality powder metallurgy TC4 titanium alloy produced from TiH ₂ sponge and AlV40 master alloy particles	17:35	Herman Lemmens (Oral) High-Throughput Quality Control on Metal Powder and Printed Parts by Automated Microscopy



17:45	Harshpreet Singh (Oral) Microstructure characterization of in-situ Ti-TiB metal matrix composites prepared by powder metallurgy process	17:50	Anders Eklund (Oral) Optimizing HIP and printing parameters for EBM Ti-6Al-4V
18:00	Jingzhe Wang (Oral) Microstructure and morphology of Ti-6Al-4V alloy prepared by powder metallurgy method using TiH ₂ as raw material		
18:15	Poster Session		
18:30	Dinner		

Day 2

Saturday, 9th September

Grand Ballroom Asia A		Grand Ballroom Asia B	
Titanium Powder Metallurgy Processing Chairman: Ian Mellor		Additive Manufacturing Chairman: Stefan Gulizia	
8:30	Peng Cao (Keynote) R&D of powder metallurgical titanium in New Zealand	8:30	Akihiko Chiba (Keynote) Effects of post-processing on fatigue strength of Ti-6Al-4V alloy fabricated by electron beam additive manufacturing
8:55	Hilda Chikwanda (Keynote) Mechanical Alloying of Ti-based Materials	8:55	Philipp Surrey (Keynote) From Powder to Solid: the Material Evolution of Ti-6Al-4V During Laser Metal Deposition
9:20	Leandro Bolzoni (Invited) Joint effect of steel addition and press-and-sinter on the properties of low-cost PM Ti alloy	9:20	Ming Yan (Invited) Modification of HDH Ti powder for developing low-cost, printable Ti-based materials, and additive manufacturing & 3D printing of TiAl intermetallics and low-modulus biomedical Ti alloy
9:40	Jian Xiao (Oral) Processing of titanium foam prepared by space holder technique	9:40	Duyao Zhang (Oral) Laser surface remelting of a metastable beta Ti alloy
9:55	Stella Raynova (Oral) Effect of microwave sintering parameters on the physical and mechanical properties of blended elemental Ti alloys	9:55	Libo Zhou (Oral) Anisotropic behavior of biomedical Ti-13Nb-13Zr alloy manufactured by selective laser melting
10:10	Break		
Grand Ballroom Asia A		Grand Ballroom Asia B	
Titanium Powder Production and Characterisation Chairman: Leandro Bolzoni		Metal Injection Moulding Chairman: Louis-Philippe Lefebvre	
10:30	Guoqing Zhang (Keynote) Gas atomisation of TiAl alloys for aerospace engineering and additive manufacturing	10:30	Hideshi Miura (Keynote) Super Excellent MIM Ti Alloys for Aerospace Application
10:55	Gang Chen (Invited) A comparative study of titanium powders for additive manufacturing by gas atomization, plasma rotating electrode process and plasma atomization	10:55	Efrain Carreño-Morelli (Keynote) An overview on the powder metallurgy processing of titanium parts from titanium hydride powder

11:15	Christian Doblin (Oral) Continuous production of Titanium-Boron alloy powders	11:20	Peng Yu (Invited) Metal injection molding of Ti alloys and its industrial applications
11:30	Yazhuo Fan (Oral) The preparation of analogous spherical titanium powders in molten salt electrolysis	11:40	Paul Ewart (Oral) Rheology Measurement and Computer Simulation of MIM Titanium Metal Powder Feedstocks
11:45	Yang Xia (Oral) Hydrogen assisted magnesiothermic reduction (HAMR) of TiO ₂ for an energy efficient production of low cost Ti powder	11:55	Ali Dehghan-Manshadi (Oral) Metal injection moulding of non-spherical hydride-dehydride Ti powders
12:10	Lunch		
Grand Ballroom Asia A		Grand Ballroom Asia B	
Titanium Powder Production and Characterisation Chairman: Hilda Chikwanda		Metal Injection Moulding Chairman: Peng Cao	
14:00	Changshu Xiang (Keynote) The technology and equipment of plasma rotating electrode process	14:00	Keli Zeng (Keynote) Development and its applications of titanium metal injection moulding
14:25	Ying Zhang (Keynote) Low temperature deoxygenation technique to prepare Ti and Ti alloy powder	14:25	Joseph Grohowski (Keynote) Improved Black Titanium Alloys via TiMIM
14:50	Ian Mellor (Invited) Development of titanium alloy powders produced via the metalysis process	14:50	Louis-Philippe Lefebvre (Invited) High Density Ti6Al4V Produced by Metal Injection Molding
15:10	Lerato Criselda Tshabalala (Oral) Characterization of Ti-6Al-4V powders produced by gas atomization for additive manufacturing	15:10	Jia Lou (Oral) Biomedical Application of Titanium and Nitinol Parts Manufactured by Metal Injection Moulding
15:25	Liming Zou (Oral) Manufacturing of high temperature Ti alloy with high Si content by powder metallurgy	15:25	Alexandra Amherd Hidalgo (Oral) Influence of alloying elements in fatigue properties of α/β titanium alloys
15:40	Chen Wang (Oral) The applications of PREPped Ti-6Al-4V powders for SLM and EBM	15:40	Jobe Piemme (Oral) Biocompatibility of Components Produced by Titanium MIM
15:55	Break		

Grand Ballroom Asia A		Grand Ballroom Asia B	
Titanium Aluminide Chairman: Akihiko Chiba		PM Biomaterials Chairman: Joseph Grohowski	
16:15	Yong Liu (Keynote) Powder Metallurgical TiAl Intermetallics: Processing and Properties	16:15	Song Cai (Invited) A group of Ni-free β -Ti alloy with large and stable room temperature super-elasticity
16:40	Rosinah Modiba (Oral) First principles modelling of novel Ti-based alloys	16:35	Jobe Piemme (Oral) Titanium PM for Orthopaedic Implants
16:55	Yu Pan (Oral) Effect of Sn addition on densification and mechanical properties of sintered High Nb containing TiAl alloys	16:50	Hong Wu (Oral) Titanium surface roughness mediates osteogenesis via modulating the immune response of macrophages
17:10	Jingwen Qiu (Oral) Effect of Niobium on the Wear Behavior of Powder Metallurgical γ -TiAl alloy in Different Environments	17:05	Ernesto Chicardi (Oral) Development of a nano-TNT (TiNbTa) potential biomaterial via a combined Mechanical Alloying (MA) and Pulsed Electric Current Sintering (PECS)
		17:20	Ming Li (Oral) Preparation and Mechanical Properties of Ti-Nb-Zr Alloy for Biomedical Applications
17:35	Poster Session		
18:00	Dinner		

Day 3

Sunday, 10th September

Grand Ballroom Asia A		Grand Ballroom Asia B	
Microstructure and Properties Chairman: Efrain Carreño-Morelli		PM Biomaterials Chairman: Fei Yang	
8:30	Thomas Ebel (Keynote) Fatigue behaviour of near-net-shape processed titanium alloys	8:30	Xin Lu (Keynote) Powder metallurgy porous Ti-10Mo alloy for orthopedic applications: Structure characterization, mechanical properties, vitro cytotoxicity and vivo osteointegration
8:55	Ming-Wei Wu (Oral) Compression Property and Fracture Mode of Additive Manufactured Ti-6Al-4V Lattice	8:55	Eugene Ivanov (Oral) Development of bio-compatible beta-Ti alloy powders for additive manufacturing for application in patient-specific orthopaedic implants
9:10	Hasani Chauke (Oral) Advances in Ti-based systems as high temperature shape memory alloys	9:10	Wei Xu (Oral) Metal injection molded Ti-12Mo alloy for dental applications: Microstructure, mechanical properties and in vitro corrosion performance in four simulated physiological electrolytes
9:25	Yuhua Li (Oral) Biomedical porous fine-grained TiNbZrTaSi alloys fabricated by powder metallurgy and crystallization of amorphous phase	9:25	Romy Schmidt (Oral) Macroporous beta-type Ti-45Nb scaffolds as hard tissue implants
9:40	Khashayar Khanlari (Oral) An investigation on the microstructural and mechanical properties of 60NiTi parts processed by conventional press and sinter method before and after solution treatment and water quench	9:40	Dapeng Zhao (Oral) Self-organized TiO ₂ nanotubes on additive manufactured Ti implants for bone regeneration
9:55	Break		

Grand Ballroom Asia A		Grand Ballroom Asia B	
Microstructure and Properties Chairman: Ben Jackson		Thermomechanical Processing Chairman: Ying Zhang	
10:15	Bin Liu (Invited) Preparation, Mechanical Properties and Wear Behavior of TiC Reinforced Ti-based Composite	10:15	Deliang Zhang (Keynote) From titanium sponge to titanium and titanium alloy components and structural members by powder metallurgy
10:35	Z. Zak Fang (Oral) Engineering the Microstructure and Mechanical Properties of Powder Metallurgy Titanium	10:40	Mingtu Jia (Oral) Microstructure and mechanical properties of Ti-5Al-2.5Fe alloy produced by powder forging
10:50	Qiyang Tao (Oral) Preparation of TiC particle reinforced titanium matrix composites by direct powder rolling	10:55	Yifei Luo (Oral) Preparation of Ti-6Al-4V Rods by Powder Compact Extrusion of TiH ₂ /Al ₆₀ V ₄₀ Powder Mixture
11:05	Ajit Pal Singh (Oral) Processing, microstructures and properties of a Ti-6Al-4V extrusion produced by an industrial scale setup		
11:20	Closing Remarks		
12:00	Lunch		
14:30	Academic visit State Key Laboratory of Porous Metal Materials and other related companies		

List of Posters

Poster	
Titanium Powder Metallurgy Processing	P01: Shengmin Fang Microstructure and mechanical properties of ultrafine structured titanium prepared by powder metallurgy and TiH ₂ powder
	P02: Elena Gordo Fatigue and oxidation behaviour of low-cost PM Ti-Fe alloys
	P03: Zhimeng Guo Study of the properties of powder metallurgy Ti-6Al-4V by low-cost hydride-dehydride (HDH) titanium powder
	P04: Zengfeng Li Preparation and Compressive Properties of Titanium Foam
	P05: Shifeng Liu Microstructure and Mechanical Properties of porous titanium by Spark Plasma Sintering
	P06: Zhiyuan Liu Ultrafast consolidation of bulk nanocrystalline titanium alloy with high strength
	P07: Paloma Trueba Muñoz A simple and economical device to process Ti cylinders with elongated porosity by freeze-casting techniques: design and manufacturing
	P08: Hongzhi Niu Low-cost high-strength PM TC4 titanium alloy produced from TiH ₂ sponge and AlV40 particles
	P09: Carlos Romero Effect of heat treatment on microstructure and mechanical properties of extruded blended elemental Ti-6Al-4V alloy
	P10: Rongjun Xu Preparation and Study of Low Cost Titanium Alloy TiAlFeMo
	P11: Ce Zhang Powder metallurgy Ti-6Al-4V with full densification and wrought-like mechanical properties manufactured by vacuum pressureless sintering
	P12: Chengshang Zhou Sintering and Processing of a Novel Titanium Matrix Composite
Additive Manufacturing	P13: Daniel Alexandre Cruz Gatões Selective Laser Melting (SLM) fabrication of shape memory NiTi functional parts
	P14: Liang Jia Mechanical properties of Ti-6Al-4V aero-component by SEBM and their forming process optimization
	P15: Nan Liu Effect of Preheating Process on the Microstructure and Mechanical Properties of Ti64 Alloy Fabricated by EBM

Additive Manufacturing	P16: Rashid Mehmood Microstructure and Mechanical Properties of Electron beam Melting (EBM) and Laser Metal Deposition (LMD) fabricated Ti-6Al-4V
	P17: Paloma Trueba Effect of the thermal treatment of Titanium samples fabricated by selective laser melting
	P18: Paloma Trueba Temperature influence on the thermo-chemical treatment of Ti6Al4V obtained by selective laser melting
	P19: Guangyu Yang Porous Biomedical Titanium alloy fabricated by selective electron beam melting
	P20: Kun Yang Effect of heat treatment on the microstructure of Ti-48Al-2Cr-2Nb alloy additively manufactured by selective electron beam melting
	P21: Quan Zhou Characterisation of the TiNi alloy by Selective Electron Beam Melting from PREP powders
PM Biomaterials	P22: Cristina Dominguez-Trujillo Bacteria proliferation in porous titanium substrates
	P23: Rijie Zhao Measurements of residual stresses in selective laser melted Ti-6Al-4V alloy cubes
Titanium Powder Production and Characterisation	P24: Yaru Cui Investigation of Electroless Copper Plating on Ti_3SiC_2 surface Using Ascorbic Acid as Reducing Agent
	P25: Zhimeng Guo Preparation of Micro-spherical Titanium Powder by RF Plasma Short Process
	P26: Kamal Hadidid UniMelt™ Process for Powder Densification and Spheroidization
	P27: Hongzhi Niu Solidification microstructures of prealloyed powders of Ti-based alloy series produced by PREP
	P28: Haiying Wang Industrialized Production Technology of Powder Metallurgy (PM) Titanium and Titanium Alloy
P29: Jingou Yin Microstructure of a metastable Ti-Ta powder fabricated by PREP	
Titanium Aluminide	P30: Yufeng Liu Densification process and mechanism of TiAl alloy powder during hot isostatic pressing



Microstructure and Properties	P31: Zhi Lu Preparation of TiO ₂ nanorod on pure Ti with sodium borate ceramic as catalyst
	P32: Yongjun Su Microstructures and Mechanical Properties of a TiAl Alloy Fabricated by Spark Plasma Sintering
	P33: Xiaoxia Zhang Cutting parameters optimization of titanium alloy milling process based on support vector machine and ant colony optimization

Plenary Speaker

Ma Qian



Dr Ma Qian is Professor of Advanced Manufacturing and Materials of Royal Melbourne Institute of Technology (RMIT University), and Honorary Professor of Materials Engineering of The University of Queensland (UQ), Australia. He received his B.Eng (1984) and D.Eng (1991) in Foundry Metallurgy both from the University of Science and Technology Beijing, China. He subsequently worked as a postdoctoral research fellow (1991-1993) and a lecturer (1993-1994) at Tsinghua University, Beijing China. Since then he has worked as a researcher or teaching and research academic with a number of institutions outside China including The University of Queensland (2000-2004 and 2008-2013) and RMIT University (since 2013). His current major research interests include additive manufacturing (AM) of Ti and other alloys; powder metallurgy of light alloys (Ti, Al, TiAl), and solidification processing. He is a co-author of *Light Alloys: Metallurgy of Light Metals* (5th edition; 2017, Elsevier, 544 pages, with I. Polmear, D. H. StJohn and J. F. Nie) and a co-editor of *Titanium Powder Metallurgy: Science, Technology and Applications* (2015, Elsevier, 648 pages, with F. H. Froes) and *Titanium in Medical and Dental Applications* (2017, Elsevier, 608 pages, with F. H. Froes). With his collaborators and team members, he has published > 60 peer-reviewed journal papers on Ti PM and AM, which have resulted in > 1100 citations (Scopus). With the strong support and encouragement of Professor George Collins (1955-2014), who was President of Materials Australia in 2011, Professor James Williams (Ohio State University), and many other colleagues including Professor Deliang Zhang (Waikato University, New Zealand) and Mr. Warwick Downing (TiDA, New Zealand), he initiated the 1st International Conference on Titanium Powder Metallurgy in 2011 at UQ, Brisbane, Australia. The conference was co-sponsored by Materials Australia, The Minerals, Metals & Materials Society (TMS), Japan Society of Powder and Powder Metallurgy (JSPM), The Chinese Society for Metals (CSM), and Titanium Industry Development Association (TiDA, New Zealand). He has served as an editorial member for a number of journals in physical metallurgy and powder metallurgy including JOM, Metallurgical and Materials Transactions A, Powder Metallurgy, Acta Metallurgica Sinica, Acta Materialia and Scripta Materialia.

Powder Metallurgy of Titanium and Titanium Alloys: Some Recent Developments and Potential Research and Business Opportunities

Ma Qian

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Abstract

Apart from the increasing use of spherical titanium and titanium alloy powders for additive manufacturing, commercial applications of powder metallurgy titanium (PM Ti) products remain limited. However, research on PM Ti has encouragingly gained momentum in recent years, which predicts a promising future of PM Ti. This paper discusses some recent research developments in PM Ti. The emphasis is placed on an updated understanding of the role of each of the five basic impurity elements in titanium by which commercially pure titanium alloys are classified, namely, oxygen (O), nitrogen (N), carbon (C), hydrogen (H) and iron (Fe). In addition, a succinct review is made of the use of boron (B) in PM Ti materials either as a sintering aid or as microscaled or nanoscaled TiB reinforcements through in-situ reactions with Ti for the fabrication of high tensile strength and ductile PM Ti materials or those with high fatigue strengths. Potential opportunities in terms of both alloy development for lower-cost fabrication of PM Ti materials and products and other applications that arise from these developments are discussed.

Plenary Speaker

Masahiko Morinaga



Nagoya University and Toyota Physical and Chemical Research Institute

Research field: Alloy design, Computational materials science, Titanium alloys.

The Molecular Orbital Approach and Its Application to Titanium Alloy Design

Masahiko Morinaga

Nagoya University and Toyota Physical and Chemical Research Institute

Abstract

A molecular orbital approach to alloy design has recently made great progress. This approach is based on the electronic structure calculations by the DV- $X\alpha$ cluster method. New alloying parameters are obtained for the first time by the calculations of titanium alloys and used for the prediction of phase stability and alloy properties. For example, it is shown that any titanium alloys can be classified into either the α or $\alpha+\beta$ or β type from the alloy composition by using alloying parameters. The corrosion resistance is also treated along this approach. A concrete way of alloy design is explained using an example of high strength β -type Ti alloys. Then, practical alloy design based on this approach is reviewed focusing on the biomedical titanium alloys. Recent progress is also presented of this approach to the design of titanium alloys for biomedical applications.

Plenary Speaker

Kechao Zhou



Kechao Zhou is a professor and the director of the State Key Laboratory of Powder Metallurgy, Central South University and is currently the deputy president of Central South University. He received his B. E. Degrees from Hunan Normal University in 1982 and Ph. D. degree in powder metallurgy from Central South University in 1998. His research interests include powder metallurgy and near net forming technology, high performance structural metal materials (titanium and copper alloys). He currently serves as a member of the Expert Steering Committee on National New Material Industry Development of China. He is also the vice chairman of the Chinese Materials Research Society and the executive director of the Nonferrous Metals Society of China.

Powder Metallurgy Technology and Industry in China

Kechao Zhou

State Key Laboratory of Powder Metallurgy, Central South University, Changsha, Hunan, 410083, P.R. China

Plenary Speaker

Z. Zak Fang



Zhigang Zak Fang, Professor, University of Utah, is a world-renowned scientist and innovator in the areas of cemented tungsten carbide, refractory metals, and titanium powder metallurgy research. Prior to joining the faculty of the Metallurgical Engineering Dept. at the University of Utah in 2002, Fang had a successful industrial R&D career and held various technical and management positions in a number of industrial corporations. Prof. Fang has established research programs and expertise

in the areas of nano powder synthesis, nano sintering, functionally graded hardmetals, powder metallurgy of titanium, and metal hydride materials for hydrogen storage and thermal energy storage.

Prof. Fang graduated from the University of Science and Technology Beijing with BS and MS degrees in 1984 and received his Ph.D degree in materials science and engineering in 1990 from the University of Alabama at Birmingham. Prof. Fang has authored/co-authored over 320 publications including, among them, over 136 peer reviewed articles. He is also the named sole or co-inventor in 49 issued US patents. A number of patent applications are pending.

Prof. Fang is a Fellow of both the American Society of Metals (ASM) and the American Powder Metallurgy Institute (APMI). He was the winner of an R&D 100 Award in 2009. He is currently serving as the Editor-in-Chief of the International Journal of Refractory Metals and Hard Materials, an Elsevier journal.

Powder Metallurgy of Ti: Past, Present, and Future – A review of PMTi Research in North America

Z. Zak Fang

Abstract

Powder metallurgy (PM) titanium is a potentially cost effective alternative to conventional titanium produced through ingot melting and wrought processing. However, after several decades of research and development, the use of PM titanium is still very limited. The inherent low cost characteristics of PM are often diminished by the need to improve mechanical properties through high pressure consolidation or thermo-mechanical processing. This article examines both the advantages and challenges facing titanium materials manufactured using PM approaches. Traditional PM processes, as well as emerging technologies, are critically reviewed. Both the production of powder and the processes for fabrication of components from the powder will be covered. In particular most recent developments for low cost production of Ti powder including CP-Ti powder and spherical powder for 3D printing, and a new sintering technology for manufacturing of PM Ti with wrought like microstructure and wrought like mechanical properties will be introduced.

Plenary Speaker

Orest M. Ivasishin



Employment Record: 1972-1979 - Junior Researcher, IMP; 1979-1987 - Senior Research, IMP; 1987-1989 - Head of Laboratory; 1989-2011 - Head of Department, Deputy Director, 2011-present – Director, IMP; 1989-2012 – Professor (part-time) of Kyiv National University, Ukraine.

Summary of past research: Since 70s I and my team have been carrying out theoretical and applied investigations in the field of phase and structural transformations in metals and alloys under highly non-equilibrium conditions. An approach which consists of the use of controlled microscale inhomogeneity of high-temperature solid solutions for optimization of phase composition, microstructure and, as a result, properties of structural materials was developed and novel technologies for aerospace and other industries were developed with this approach. From 1977 to 1991 I took part in defense research programs under contracts with Ministry of Aviation Industry of USSR (development of materials and technologies for aircrafts and missiles). Since 1990, I have been carrying out research program in field of powder metallurgy of titanium alloys and titanium aluminides, in particular investigation of phase and structural transformations on synthesis of these materials using elemental powder blends. In 1989-2012 I have been teaching courses “Physics of Phase Transformations”, “Structural Phase Transformations” and “Advanced Aerospace Materials” in the Department of Physics in Kyiv National University.

Main areas of interest: Solid State Physics, Physics of Metals, Physics of Strength and Ductility, Phase and Structural Transformations, Aerospace Materials.

Research and Development in Titanium Powder Metallurgy in CIS

Countries

Orest M. Ivasishin¹, Andrey Aleksandrov²

¹Kurdyumov Institute for Metal Physics, Ukraine

²CIS International Titanium Association, Ukraine

Plenary Speaker

Huiping Tang



Professor and Director of the State Key Laboratory of Porous Metal Materials, Northwest Institute for Non-ferrous Metal Research (NIN), China

Deputy Chief Engineer of NIN

Director of the Powder Metallurgy Research Center of NIN

Part-Time Professor of Northeastern University, Central South University, Jilin University and Xi'an University of Architecture and Technology, China

The research interest of Prof. Tang includes porous metal materials, 3D printing or additive manufacturing of metals, and powder metallurgy of titanium, tungsten, molybdenum and other rare metal materials. She has led the development of more than 10 new products/technologies and realized commercialization of each product/technology, which has generated an accumulated value of over one billion RMB in the energy, environmental protection, aerospace and other industries. She has served as an editorial member for a number of journals in physical metallurgy and powder metallurgy including Powder Metallurgy Technology, Powder Metallurgy Industry, Rare Metal Materials and Engineering, Membrane Science and Technology, China Molybdenum Industry and Materials China. The honors she has received include State Council Special Allowance (2006), Distinguished Sanqin Scholar, Shaanxi Province (2012), and The National Key Talent Project (2015). Till now, she has edited 6 books, published more than 170 peer-reviewed papers either on powder metallurgy and additive manufacturing, and achieved over 60 authorised patents.

Development of Metal Additive Manufacturing in China

H.P. Tang

State Key Laboratory of Porous Metal Materials, Northwest Institute for Non-ferrous Metal Research, Xi'an, Shaanxi, 710016, P.R. China

Abstract

Metal additive manufacturing (AM) in China can be dated from early 1990s. Due to the powerful drive of the national policy and capital, the technology and industry of metal AM in China have been significantly boosted in the last 5 years. This arises a number of companies specialized in materials, equipments and its applications for metal AM in China. Some additively manufactured products have been successfully used in many industrial fields including aerospace and biomedical areas. In this study, the historical development of metal AM in China is reviewed. Additionally, the governmental research projects and key points have been summarized in recent years. It also presents the technological progress of typical metal AM techniques in China such as LENS, SLM, SEBM and EBF³. Finally, the author delivers the future perspectives of its technology and industry for metal AM in China.