



POWDER METALLURGY ASSOCIATION OF INDIA

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Editorial

The enormous strides taken by PMAI in representing the Indian PM industry in the global PM community is reflected in this newsletter. President Gopinath was conferred the International Co-operation Award at the World PM 2018 Conference in China. Congratulations!

President Gopinath was part of a public-private partnership promotion effort at the ARCI Centre, Hyderabad. Representation of several industries engaged in powder metallurgy met ARCI scientists to brainstorm and convey the requirements of the private sector with the aim of promoting contract research and development work that ARCI can engage in. Through this partnership ARCI hopes to fuel original technology development to industry.

We pay our homage to one of our dear colleagues Mr. J. Sachdeva, who was an active member of PMAI. Mr Sachdeva has received many awards for his entrepreneurial spirit.

PMAI participated in CII's surface & coating EXPO 2018 in Chennai and the ASM International's MET + HTS 2018 Intl. Conference in Mumbai. Also reported in this newsletter are the achievements of PMAI corporate members- Singhal Sintered Pvt.Ltd., and GKN Sinter Metals India.

Preparations for APMA 2019 - the Asian Powder Metallurgy Association's international conference - are in full swing. The event will bring together experts from all APMA member countries (China, India, Japan, S. Korea, Taiwan and Thailand), the rest of Asia and the world, to discuss the latest advancements and applications in PM.

Trans. PMAI Vol.44 (1) 2018 has been finalized and will be available on the PMAI website soon.

P Ramakrishnan

Appeal: We need from PMAI members, news items for publication in this (thrice yearly) newsletter. This includes technical developments, new products, business developments, promotions, job changes, organizational changes, mergers & acquisitions or just plain gossip. We would like to publish your stories (editorial rights reserved) regularly.

NEWSLETTER

Facilities at ARCI Centre, Hyderabad for Nanomaterials

ARCI (International Advanced Research Centre for Powder Metallurgy & New Materials), an autonomous research & development centre of the Department of Science & Technology, Govt of India, is looking for contract R&D proposals from private companies. ARCI can provide (or supplement) original technology development. Dr G Padmanabham, Director of ARCI and Dr R Vijay, Team Leader of the Centre for Nanomaterials (+ 91 40 24452334, vijay@arci.res.in) shared with PMAI, a preview of the equipment & facilities they possess apart from highly skilled scientists.

60 kW/ 2-5 MHz RF Induction Plasma Unit for production of metal powders, their oxides or carbides. Powder size: 50 - 500 nm (1 kg/h). Can be used under inert, oxidizing or reducing atmospheres.



10 Ton & 100 Ton Spark Plasma Sintering Units for consolidation of metal, ceramic, alloy, composite powders under inert or vacuum atmospheres in graphite or tungsten carbide dies. TMax is 1400°C. Max Ø- 100 mm.



Inert Gas Atomizer for producing powders of steels, super alloys, Al alloys, Cu alloys, MCrAlY and CoCrAlY. TMax of furnace- 1750°C. Melt capacity- 10 kgs/ hr (Fe, Cu and Ni alloys) and 5 kg/ hr (Al alloys).



Continuous Multi-piston (10Ton/piston) Progressive Reactive Hot Press for hot pressing of ferrous and non-ferrous powders in graphite dies under H₂ or inert atmosphere. Parts with 94-96% sintered density achieved. Max Ø- 50mm.



1 kg & 5 kg High Energy Horizontal Ball Mills used to produce nanostructured materials and non-equilibrium phases. Low milling times due to high kinetic energy.



1 kg/ batch Cryo Mill to produce nanopowders like boron, iron, ultrafine steel and iron aluminides.



0.5 - 3 kg/hr Flame Spray Pyrolyser to produce regular or doped 20-100 nm powders from liquid feed stock, in required purity. Eg: ZnO for varistors, LiFePO₄ for Li-ion batteries, TiO₂ for photocatalysis.



3Ton/piston Hot Press for pressing powders, re-pressing & coining under H₂ or inert atmospheres upto temperatures of 1050°C. Vertical loading possible. Max Ø- 80mm.



Table: Powders being produced at ARCI Centre for Nanomaterials

Powder metal/	Synthesis	
IN718	IGA	8 kg/batch
IN625	IGA	8 kg/batch
SS403	IGA	8 kg/batch
Ferritic steels	IGA	10 kg/batch
F/M steels	IGA	10 kg/batch
ODS -Steel*	HEHBM	
Al-CNT*	HEHBM	
Fe Al	HEHBM, CM	
Cr ₃ AlC (MAX)*	HEBM+A	
Al	RFP	1 kg/hr
B*	MT+RFP(+PS), CM	
WS ₂ /MoS ₂ * (TMS)	MWP/BM+RS	2 kg/day

IGA: Inert Gas Atomization; **HEHBM:** High energy horizontal ball milling (Zoz); **CM:** Cryo milling; **MT:** Magnesiothermic; **RFP:** RF- Plasma processing **MWP:** Microwave plasma; **BM:** Ball milling **RS:** Reaction synthesis; **A:** Annealing * Use of nano-additives/functional additives/coatings

Facilities at Surface Engineering and Laser Processing Centres

Detonation Spray Coating Unit is used for thermal spraying of metal powders, oxides, carbides & nitrides, stellites with inter-metallics and quasi-crystalline coatings. Thick coatings with average surface roughness of 4-6 μm Ra can be achieved.



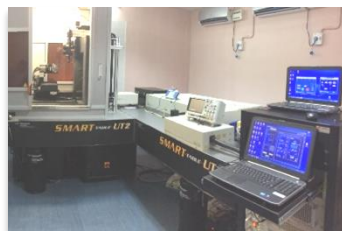
Cold Gas Dynamic Spray is used to form dense, thick and pure coatings with high deposition rates. Coatings range from metal or alloy powders to metal-metal oxides combinations, composites, nano- and amorphous-powders. Porosity is <1%. Original powder properties are retained.



Selective Laser Melting Machine can process components using additive manufacturing or hybrid manufacturing. Equipped with a 400 W Ytterbium Fiber Laser. Provisions for 3D scanning are available. The integrated heating platform can be heated upto 200 °C.



12 Kw, 10kHz (100 fs to 100 ns pulse duration) Ultrafast Micro-Machining System is used for micromachining, micro texturing, micro-cutting, engraving, ablation etc.



Apart from the above facilities, **fibre coupled diode laser, 3.5 kW CO₂ slab laser, pulsed Nd-YAG laser and cold metal transfer units** are also available.

PMAI Participated in CII's Surface & Coating Expo 2018 (Association Partner) in Chennai + ASM International's HTS 2018 conference in Mumbai.



PMAI Corporate Members' Achievements

Singhal Sintered Pvt Ltd has received the **"Best Supplier Award"** under **new product development** category from **Mitsubishi Heavy Industries – VST Diesel Engines Pvt Ltd** for its **Gear Oil Pump (Inner & Outer)**



GKN Sinter Metals India received the **"Part Development (Build to Print) Award"** from **Maruti Suzuki**. The award was given for GKN's ability to develop complex parts from an early phase and for meeting close tolerances.

Obituary: Mr. Jagjeet Singh Sachdeva

Managing Director, Deekay Clutches & Newmet Pvt Ltd
(10.05.1939 – 26.07.2018)



After completing his studies in Punjab University, Mr Jagjeet Singh Sachdeva obtained a Diploma in Civil Engineering from Madras University in 1957.

In 1959 he started a small workshop to repair automotive clutches. He then graduated to making specialised clutches for industrial applications. This needed sintered friction materials and to stay competitive, he started a plant Deekay Clutches in 1975. It was at this time that he attended the PMSC course by PMAI and thus began his long association with the organization. Mr Sachdeva indigenously produced all the accessories required for sintered friction materials. Mr Sachdeva was the first to design, fabricate, install and commission mechanical presses in India when he started Newmet Pvt. Ltd

Mr Jagjeet Singh Sachdeva received the A. R. Bhat Entrepreneurship award in 1984 and the prestigious Gold Shield Award in 1985 for import substitution of disc brakes and different types of transmissions. For his contributions to the PM industry in India, PMAI conferred him with the title Fellow of PMAI.

PM Events (Sept-Dec 2018):

WORLDPM 2018 (WORLD CONGRESS)

16-20 September, 2018
China National Convention Centre
Beijing, China
www.worldpm2018.com

PMSC18

12 – 15 October 2018
Collage of Engineering, Pune
www.pmai.in/pmcs18

EuroPM 2018

14 - 18 October 2018
In Bilbao, Spain
www.europm2018.com

WorldPM2018 Held in Beijing from September 16 – 18, 2018

The biennial World Powder Metallurgy Congress and Exhibition alternates between Asia, North America and Europe. The 2018 congress (WorldPM2018) was organized by the Chinese Society for Metals (CSM) and China Powder Metallurgy Alliance (CPMA) in Beijing, China. The three day event saw more than 560 technical papers being presented by industry leaders, academia and scientists from around the world, covering PM technology areas like PM components & processes, additive manufacturing, powder injection moulding, metal powder preparation, porous materials, hard alloys and many more. The companies from India that participated in WorldPM2018 were Fluidtherm Technology, Hogas India....

International Co-operation Award

N Gopinath, President of PMAI was one amongst a distinguished group of PM leaders who were awarded the **International Co-operation Award** at the WorldPM2018 conference in China. The award captures the significant contribution of the recipients to the promotion and development of powder metallurgy worldwide.



Work Underway for APMA 2019

PMAI is hosting the Asian Powder Metallurgy Association's 5th International Conference on PM in Asia at the JW Marriott Hotel, Pune from Feb 19 – 21, 2019. This is the first time this event is happening in India and it will be the largest PM conference ever to be held in the country.

APMA 2019 has six seminars that run concurrently- Press & Sinter Technologies, Additive Manufacturing, Powder Injection Moulding, Ceramics & Composites, New Materials for Emerging Applications and Hard Metals & Diamond Tools.

APMA 2019 will have speakers and delegates from all APMA member countries (China, India, Japan, S. Korea, Taiwan and Thailand), rest of Asia and the world.

Plenary speakers include Mr Alok Nanda, CTO at GE Additive South Asia, Dr Animesh Bose, VP at Desktop Metals (USA), Prof Janusz Konstany, Author and Professor of Metallurgy at AGH University of Science & Technology (Poland), Dr Cesar Mollins, General Director of AMES (Spain), Mr Rohit Shivanath, Director of Metallurgy at Stackpole (Canada), and many more.

Furthermore, a special campaign is being run to attract OEMs to attend the conference to understand the potential applications of PM in their business and to meet potential vendors.

APMA 2019 is a great platform to learn from and collaborate with PM professionals from around the world. To register as a delegate, please visit the event website. Call for abstracts is open till November 30, 2018. To sponsor or exhibit at APMA 2019 please email conadmin@apma2019.com. Limited number of stalls available.

2ND CALL FOR PAPERS
Deadline: 30 Nov, 2018
www.apma2019.com

Members: PM Associations from China, India, Japan, R.O.Korea, Taiwan & Thailand

Pre-conference Events: Mon 18 Feb, 2019
Conference: Tue 19 Feb- Thur 21 Feb, 2019

**5TH INTERNATIONAL CONFERENCE ON
POWDER METALLURGY IN ASIA
+ EXHIBITION**

Venue: JW Marriott Hotel Pune, India

APMA 2019 SEMINARS



**INDUSTRIAL PM
(PRESS &
SINTER)
TECHNOLOGIES
FOR AUTO,
ELECTRICAL &
MACHINE PARTS**



**POWDER
INJECTION
MOULDING
(MIM + CIM)**



**ADDITIVE
MANUFACTURING
(3D PRINTING)**



**TECHNICAL
CERAMICS &
COMPOSITES**



**DEVELOPMENT
OF MATERIALS
& ALLOYS FOR
EMERGING
APPLICATIONS**



**HARD METALS &
DIAMOND
TOOLS**

- o Largest conference on Powder Metallurgy & Particulate Materials ever held in India
- o Speakers & delegates from all over the world (with large delegations from all APMA member countries)
- o Great platform to learn from and collaborate with members of the global PM community
- o Accompanying exhibition showcases innovative products, technologies & organizations
- o Several generous awards for students, academia & young professionals