November 2012

Message from Chair

Hearty greetings to all members. This edition of News Letter is the first issue after the assumption of new office bearers. Our editorial members of the News Letter like to bring in new look to News Letter. This will contain the news that is happening in the material world, some good technical articles in addition to chapter news.

We have planned to have lots of activities for the year 2012 - 13. We have kick started our activities by successful completion of three Metallurgical courses. Our HT convention and conference is taking a good shape. The response had been very warm and we are sure with good participation of all members it will be grand success. We welcome our new student chapter VIT at Vellore to our ASM Chennai chapter as an another family group. There is lots of ups and down in the general Industrial trends. Our members mostly associated with auto Industries are having some anxiety with regards to performance of the industry. With the past experience we hope that this is only cyclical effect and there will be upswing in the Industry. Another thing we need to concentrate is on concentrate on membership drive. We need to concentrate on corporate organizations for sustainable members.

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VAP Induction Pvt. Ltd

Mr. K Sreekumaran
Coimbatore Activities
Activities of ASM Chennai Chapter

Training programs at a Glance

• ASM International Chennai Chapter conducts Public training programs in metallurgy related subjects from basics to advanced levels. In-house training programs are conducted to various levels in an organization considering the requirements of that organization.

• Two day training programme on Metallurgy for Non-metallurgist was conducted on 22nd and 23rd June 2012 at Hotel Jaya Pushpam, 1131, Inner ring Road, Koimbedu, Chennai. Sixty-two participants from various organization s were benefited by this course.

• ASM International is a Knowledge Partner to TAFE Limited. A two day tailor made training was conducted for their Engineers on 20th and 21st July 2012 at Chennai. This programme was conducted for the third time for their employees.

• A Certificate course on Practical Metallography was conducted under the guidance Prof. B. S. Murty for the first time in India. The four day full time hands on practical training with advanced Met-Lab equipment was conducted from 23rd to 26th July 2012 at the premises of Chennai Metco, Ambattur Industrial Estate, Chennai- 600058. There were about 50 applications. Since it is a practical training and facilities , ASMICC could accommodate twelve applicants only. The other applicants registered will be accommodated in September and subsequent months. Mr. C. Renganathan, Prof. Murty and Dr. Krishnaraj have taken extraordinary care to match the quality of the programme to International level. At the end of the training all the trainees appeared for the examination. The participants from various part of the country appreciated the course very much.

• Practical Metallography course: The second course was conducted from 12th to 15th September 2012 at Chennai Metco premises. 9+1 Participants undergone the training

• Certification Training Programme on Heat treatment was conducted at AIMA Centre between 31st Oct. 12 and 3rd Nov.12. 37 participants from various organizations undergone training and passed the Examination.

A Training Course on “Corrosion Prevention and Control” was held during 14 – 15 February, 2012, at IC & SR Auditorium, IIT Madras, Chennai, jointly by ASM Chennai Chapter and NIGIS South Zone. The course had 110 registered participation from the industry, academic and research institutes. The course co-coordinators’ were Dr. T.S.N. Sankara Narayanan, NML, Chennai and Prof. M. Kamaraj, Dept of Metallurgy & Materiel Science, IIT Madras, while Dr. U. Kamachi Mudali was the course Convener. The course had 13 lectures in two day programme from eminent speakers representing industry, institute and universities. The technical lectures were on a variety of topic ranging from basics of corrosion to control and monitoring.

The inaugural programme started at 0930 hrs with welcome address by Dr. U. Kamachi Mudali, Vice Chairman, ASM Chennai Chapter & President, NIGIS South Zone, followed by Presidential address by Shri V. L. Sridharan, Chairman, ASM Chennai Chapter. The course was inaugurated by Prof. Christopher Berndt, President, ASM International, USA and Chief Guest of the function. He has highlighted three important points of being ASM member, which includes benefits, networking and services, and the coordination between ASM and NACE in establishing Corrosion Network Analysis. Dr. Samir Degan, Director, NACE International – East Asia Pacific Region, highlighted the role of NACE in inculcating corrosion science and technology to students and industry. Shri TK. Mitra Director (Technical), BHAVINI, Kalpakkam was the guest of honour, and he brought out the significance of corrosion control and preservation in mega projects. Dr. T.S.N. Sankara Narayanan, Course Coordinator proposed a vote of thanks. Lectures were delivered by eminent and experienced persons from academia, research labs and industry such as Prof. S. K. Seshadri, Emeritus Professor, Dept of Metallurgy & Material Sciences, IIT Madras, Dr. U. Kamachi Mudali, IGCAR, Kalpakkam, Dr. T. S. Rao, BARC, Kalpakkam, Dr. T.S.N. Sankara Narayanan, NML Chennai, Sh. S. Ravichandran, Berger Paints, Kolkata, Dr. G.T. Parthiban, CECRI, Karaikudi, Prof. Kamaraj, IIT Madras, Dr. S. Rangarajan, WSCD, BARCF, Kalpakkam, Dr. V. Balasubramanian, Annamalai University, Chidambaram, Shri G. Jothinathan, CNDE, IIT Madras, Shri Rajes Bardia, Akzo Nobel, Bangalore, Dr. T. Sundararajan, Wheels India, Chennai, and Shri P. K. Mathew, Cortec-India, Bangalore.
Technical Talks

- ASM International Chennai Chapter and Madras Metallurgical Society organized a Technical Talk on "QuenchProbe - A superior alternative to the ASTM Standard Test Method for Cooling Curve Analysis of Quenchants" by Prof. T. S. Prasanna Kumar on Sunday, 30th June 2012 at Hotel Jayapushpam

- ASM International Chennai Chapter and Madras Metallurgical Society organized a Technical Talk on "High Nitrogen Steels and Stainless Steels for Industrial Applications" by Dr. U. Kamachi Mudali on Sunday, 9th September 2012 at Alumni Club of Anna University

Two-day course on Metallurgy for TAFE

July 20-21, 2012, TAFE, Chennai

ASM International is a Knowledge Partner to TAFE Limited. A two-day tailor-made training was conducted for their Engineers on 20th and 21st July 2012 at Chennai. This programme was conducted for the third time for their employees.

Heat Treatment Course in Tamil

The four-day full-time course was conducted at AIEMA Technology Centre, Ambattur Industrial Estate on 31st October to 3rd November 2012. Thirty seven (37) practicing heat treatment personnel and purchasing engineers have undergone the training and appeared for the examination at end of the course. Besides awarding certificates to the successful candidates the first three rank holders were given special prizes.

Metallurgy for the Non-Metallurgists

June 22-23, 2012, Hotel Jayapushpam, Koyambedu, Chennai

This 2-day course was conducted very successfully and was coordinated by Mr. V. P. Parthasarathy and Dr. T. Sundararajan. The lectures were delivered by eminent persons from academia and industry. The lectures were on introduction to engineering materials, heat treatment principles and processes, metal forming, selection of materials for engineering applications, welding metallurgy, surface engineering, metallurgy of cast iron, metallurgy of aluminium alloys, emerging materials, and engineering plastics.

Activities of ASM Chennai Chapter

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Inauguration of Material Advantage Chapter at Vellore Institute of Technology

Material Advantage Charter of Vellore Institute of Technology University – VITMA was formed with 39 members on 21st September 2012 at Rajaji Hall of VIT, Vellore. The Charter was approved by ASM, AcerS, AIST and TMS on 15th July 2012. Welcome address was given by Professor V. Umashankar, Faculty Advisor of VITMA. The Vice Chancellor Dr. V. B. Raju and Pro Vice Chancellor Dr. S. Narayananan presided over the function and felicitated the gathering.

Mr. M. Narayana Rao, Chairman and Managing Director of Mishra Dhatu Nigam Limited, Hyderabad, a Government of India Organization developing Advanced Materials for strategic applications required by Defense, Space and Atomic Energy of India was the Chief Guest. He was also the Past President of the Indian Institute of Metals, India. In the inaugural address, Mr. Rao advised the student members of VITMA to take advantage of huge resources available from the memberships of combined organizations like ASM, AcerS, AIST and TMS for benefitting to learn state of the art in advanced materials.

Mr. V.L. Sridharan, Past Chairman of ASM, Chennai Chapter along with Chief Guest presented the Charter to Director, School of Mechanical and Building sciences. Mr. Sridharan also talked about ASM and its activities and advised students to actively participate in the Chennai Chapter activities. Dr. U. Kamachi Mudali, Vice Chairman, ASM Chennai Chapter & Associate Director of Indira Gandhi Center for Atomic Research, Kalpakkam gave an introduction to Material Advantage its benefits and activities. He also highlighted the activities of other Material Advantage Charters of ASM, Chennai and innovative programmes that can be pursued by VITMA. In the end, vote of thanks was given by VITMA Chairman Mr. Priyanshu Mishra.

On the occasion of the inauguration of VITMA a series of technical lectures were organized in the afternoon. Dr. U. Kamachi Mudali delivered a talk on “Materials – Past, Present and Future”. He has presented the complete development of materials from stone age to the present day nano materials. The complete development cycle and the various challenges faced for advanced materials required was highlighted by him.

Prof. Vikram Jayaram, Chairman of Materials and Metallurgical Department of IISC, Bangalore gave a talk on “Materials - a Bridge between Science and Engineering. He was addressing the demand for new materials and the invention happened meeting the requirements. He has touched upon biomimics and other latest new technologies.

Dr. T.S. Sampathkumar, Professor of IIT Madras, Chennai delivered a lecture on “Bio and Nano Materials” covering all about bio implants. He gave an overview of all bio materials and their applications in human body. He has also touched on various nano coating which enhances the performance of the implants meeting the challenges.

Certificate Course on Practical Metallography

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There were about 50 applications. Since it is a practical training and facilities, ASMICCC could accommodate twelve applicants only. The other applicants registered will be accommodated in September and subsequent months. Mr. C. Renganathan, Prof. Murty and Dr. Krishnaraj have taken extraordinary care to match the quality of the programme to International level. At the end of the training all the trainees appeared for the examination. The participants from various part of the country appreciated the course very much.
For common man the term “glass” reminds the oxide glasses such as window glass or drinking glass which are optically transparent and brittle. However, for scientists the term “glass” has wider sense as a solid material that possesses non-crystalline (i.e., amorphous) structure which exhibits a glass transition when heated towards the liquid state. In simple words, for a crystalline structure the atoms are arranged in regular pattern called space lattice and for an amorphous structure the atoms are randomly arranged with no long range order. Imagine an organized military parade for a crystalline structure and a crowded Ranganathan Street of Chennai during festive seasons for an amorphous structure.

To make a metal into glass form, the first step is to bring the solid metal to its liquid-state by heating and melting and then cooling the melt rapidly to room temperature. The idea behind this rapid cooling is to retain the atoms which are randomly distributed in the molten state to room temperature, by “locking” the atomic distribution with randomness to provide amorphous structure. However, to produce a glass from a pure metal, one would have to cool the liquid melt at a practically impossible cooling rate and so crystallization is unavoidable. Thus we need to have many atoms in the structure as alloys, such that the atoms are ‘frustrated’ in forming an organized crystalline structure as BCC, FCC, HCP etc.

In 1960, metallurgists from Caltech University-USA, produced the first metallic glass by kinetically by-passing the crystallization in a Au-Si$_3$(at%) alloy by cooling it at a rate of ~ 1,000,000 °C/s[1]. Such a high cooling rate was achieved by allowing the molten metal to solidify on a Cu-wheel that was rotating at a very high speed. This process is called as ‘melt-spinning’ technique. However, the high cooling rates limit the amorphous alloy geometry to narrow thin ribbons. After this achievement, scientists all around the world were excited and motivated to identify several other glass forming alloy system that requires lower cooling rate so that glassy alloys can be produced in bulk form. In 1993, researchers from Caltech again used casting technique (low cooling rate of 100 °C/s) to produce bulk metallic glass (BMG) with a critical casting thickness of several centimeters in Zr$_{41.2}$Ti$_{13.8}$Cu$_{14.6}$Ni$_{10.4}$Be$_{10.0}$ system (Vitrelloy 1)[2]. These bulk glass forming alloys consists at least four or five elements that possess atoms of varying sizes that upon cooling at sufficiently fast rates, the constituent atoms are in ‘confusion’ or ‘frustration’ so that they simply cannot coordinate themselves into the equilibrium crystalline lattice. This set a trend in Germany, Japan, Korea etc. to produce variety of BMG alloys of different compositions and forms targeting several applications. Now after more than 50 years of invention of metallic glass, BMG alloys are available in several alloy systems such as Au-, Pd-, Pt-, Zr-, Ti-, Ni-, Cu-, Fe-, Mg-, and Rare Earth-based BMGs [3].

BMGs with amorphous atomic structure exhibit an unique set of characteristic properties [3]. Unlike oxide glasses, BMGs are not optically transparent and they look like ordinary metal (Fig.1). These materials have high yield strength, high hardness, superior strength/weight ratio and superior elastic limit (Fig.2). One of the most unique characteristics of BMG alloys is to behave like “plastic” in the temperature range between glass transition and crystallization onset temperature [4]. By utilizing the plastic-like flow behavior, BMG parts shall be made by die casting, injection molding and blow molding, etc (Fig.3). Blow molding of BMGs are efficient in time and energy consumptions due to the fact that the three separate steps in traditional metal processing (shaping, joining and finishing) were combined into one.

Ni- and Zr-based BMGs are also used for fabrication of micro-gears, micro-springs, and micro-motors as engineering parts at small scale (Fig.5). Fe- based metallic glasses were used as transformer magnetic core. Moreover, metallic glasses shall serve as protective coatings in industries where the components are subjected to severe wear and corrosion (Fig.6). BMGs also find application in defense such as spacecraft and kinetic energy penetrators (Fig.7). Due to their attractive properties, the future of BMGs is promising and the alloy design will focus on diversified applications.

References:
8. JC Huang, JP Chu, JSC Jang, Intermetallics 17 (2009) 973

Commercialization of BMGs and their application is just at the beginning stage and there is a lot of scope for applications. Liquid Metal Technologies-USA [5] uses Zr- and Ti-based BMGs in golf clubs, tennis rackets, baseball and softball bats and also for tennis, golf, and baseball balls for a better performance. Micro-parts (tools) such as stent, tweezers, scalpels, knives made up of Zr-based BMG for medical uses are already commercialized (Fig.4).

Dr. U. Kamachi Mudali is a well known materials and corrosion specialist in the area of development of advanced materials and coatings for aggressive environments, localized corrosion, and corrosion monitoring and corrosion protection technologies. Dr. Mudali has published 225 papers in peer reviewed journals, 180 in proceedings, books and internal reports, 1 encyclopedia article, 155 plenary, keynote and invited lectures, 10 edited books and proceedings, and has 3 patents to his credit. He has an average citation of 7.91 per paper and the h-index is 21 without self-citation. He is a Professor and Faculty Member of the Homi Bhabha National Institute (University), Mumbai, and an Adjunct Professor of PSG College of Technology, Coimbatore. He has guided and coordinated thesis of 118 B.Tech., M.E., M.Tech. M.Sc., M.Phil and PhD students at IGCAR, Kalpakkam. He has been a visiting scientist at leading institutions in Germany, Japan, France, UK, and Israel.

Dr. Mudali has won several awards in recognition of his excellent R&D contributions in corrosion science and technology, including: National MASCOT Corrosion Award (2000), ONGC Excellence in Corrosion Award (2003), Homi Bhabha Science and Technology Award (2004), National Metallurgists Day Award (2005), NACE Meritorious Contribution in Corrosion Award (2009) and DAE Group Achievement Award (2011). He is a Fellow of Indian Institute of Metals (2006), Indian National Academy of Engineering (2009), Institution of Engineers (2009), Electrochemical Society of India (2008) and Tamil Nadu Academy of Sciences (2010). Dr. Mudali is Associate Editor of Journal of Electrochemical Society of India, and a Member of the Editorial Board of International Journals of: (i) Corrosion Reviews, (ii) Surface Engineering, (iii) Transactions of IIM, (iv) Materials and Manufacturing Processes, and (v) Journal of Materials Science and Technology. He is currently President of NACE International Gateway India South Zone, Vice Chairman of ASM International Chennai Chapter and Vice Chairman, National Corrosion Council of India, Kairakudi.
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Silver Jubilee Function of ASM International Chennai Chapter

The silver jubilee celebrations of ASM International Chennai Chapter was held on the 14th of February 2012 in Hotel Raintree. The function was graced by Prof. Christopher Berndt, President of ASM International.

Mr. T.V.N. Kidao was a metallurgist par excellence. After serving GOI, in their Defense Department in various positions he joined Ashok Leyland Ltd. as Chief Metallurgist and Chief Inspector. He was trying to start an ASM Chapter in Chennai. Dr. V. Gopal of Lucas TVS and Mr. A. Krishna Swami of Hindustan Motors Ltd. (Present Caterpillar India Private Ltd.) supported Mr. T.V.N. Kidao to inaugurate “Madras Chapter” in June 1985. The then President Dr. Brian Ives and Mr. J. D. Cox visited Madras and presented the Charter and installed the Office bearers in June 1985. Unfortunately the Chairman, Mr. TVN Kidao passed away in November 1985. The Vice President, Dr. V. Gopal steered the Chapter till the end of the year.

Mr. T.V.K. Kidao, treasurer of the Chapter, younger brother of Mr.TVN Kidao, continued to support the Chapter by providing Office space and carefully managing the Finance. Mr. A. Krishna Swami continued as the Secretary from 1985 to 1992. Dr. K.V. Krishnamurthy of Sundram Fasteners, Mr. N.R. Ranganathan, a small scale industrialist, Mr. S. Nagarajan of Ashok Leyland, D.G. Sastry, an industrialist specializing induction equipment and Mr. P.K.M. Pillai, a Small scale Industrialist nurtured the Chapter and contributed their might.

There was a turning point in the new millennium. Mr. V.Parthasarathy, an Industrialist, took over the Chairmanship of the Chapter, involved new young members and led the Chapter to get Five Star Award continuously and also Chapter Excellence Awards. Dr Bhanu Sankara Rao made considerable improvement through his wide contacts. Mr.V.L. Sridharan, an Industrial valve manufacturer, ably steered the Chapter and expanded the activities. He has opened a full time office for the Chapter. During his tenure the Silver Jubilee function was organized and a decision was taken to organize an Exhibition cum Convention on Heat treatment & Surface Engineering during May, 2013. Now Mr. B.K.Venkatesh, an industrialist is heading the Chapter with the support of the able Secretary, Mr. N. Sampathkumar. Mr. TVK. Kidao continues as the Treasurer.

Silver Jubilee was a mile stone in Chennai Chapter's history. The President of ASM International, Prof. Christopher Berndt, travelled all the way to Chennai to participate and chair the formal function. During his stay in Chennai, he inaugurated the conference on Corrosion Control ably organized by Dr. U. Kamachi Mudali and supported by Prof. B.S. Murty and Prof. M. Kamaraj. The President addressed the Students and Professors at IIT Madras and the Press meet organized by Mr.D.G.Sastry, at Chennai. The formal function was held at Rain Tree Hotel, Anna Salai, Chennai and Mr. V.L. Sridharan chaired the formal evening function. Professor Christopher Berndt addressed the gathering from various industries.

Dr. Venugopal of TISCO delivered a speech on latest technology in Steel production. Mr. James Golson, Principle Commercial Officer, US Consulate Chennai addressed the participants. The Chairman, India Council, ASM International, Dr. P. Renavikar gave the details of the benefits for an ASMI members in his short speech. The members who have continuously involved in the Chapter activities were recognized. The President distributed the awards to the member organizations that have made significant improvement in their industries. The function ended with grand dinner.
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Research and Industry News

- Cambridge University spin-out Metalysis, U.K., has commercialized an innovative process that can transform natural rutile sands directly into titanium metal powder in a single step. Rutile is a naturally occurring titanium ore present in beach sands. The breakthrough in the use of rutile ore as the feedstock is part of the decade-long development of a highly efficient, cost-effective, and transformational technology for producing specialty metals. In addition to titanium, tantalum and specialty metals (including rare earths), can be produced on a commercial scale with a significantly reduced environmental impact. The process is also suitable for the recycling of strategic metals.

(http://www.enterprise.cam.ac.uk/news/2012/9/metalysis-successfully-produces-titanium-powder-di/)

- Researchers at the Fraunhofer Institute, Germany, have developed a new technology for hydroforming titanium automotive exhaust systems at elevated temperatures. They designed a process and a custom tool that can withstand temperatures of over 800°C. A coating just a few micrometers thick prevents titanium from adhering to the tool. This new method enables forming to be undertaken in a single process stage.


- Removing lead from manufacturing processes and products is high priority for the European Union. A European research program has tackled the problem of high-temperature solders used in the electronics industry. One solution is to use so-called nanosolders based on tin-antimony (Sn-Sb) alloys. Nanoparticles have a lower melting point than the bulk substance. Funded by the EU, the project ‘A chemical approach to lead-free nanosolders’ (Nanosold) aimed to develop new lead-free high-temperature solders with Sn-Sb-M alloys. M is silver (Ag), copper (Cu), and nickel (Ni).


- Ford Motor Co. demonstrated a prototype carbon fiber bonnet that could help lower fuel consumption at the Composites Europe event in Dusseldorf, Germany. The carbon fiber reinforced plastic Ford Focus bonnet is constructed from the super-strong material usually associated with bespoke racing vehicles or high-performance sports cars.

(http://www.asminternational.org/portal/site/www/NewsItem/?vgnextoid=9c2e253de4dba310VgnVCM100000621e010aRCRD)

- Red gold, green gold – a ground-breaking initiative has found a way of changing the color of the world’s most iconic precious metal. A University of Southampton, UK, team discovered that by embossing tiny raised or indented patterns onto the metal’s surface they can change the way it absorbs and reflects light – ensuring our eyes don’t see it as ‘golden’ in color at all. The finding results from a major initiative funded by the Engineering and Physical Sciences Research Council (EPSRC) targeting the development of a new generation of nanotechnology-enabled materials.

(http://www.asminternational.org/portal/site/www/NewsItem/?vgnextoid=03529895a3d9a310VgnVCM100000621e010aRCRD)

Upcoming Activities and Events

- ASM International Chennai Chapter is organizing a 3-day internship conference Heat Treatment and Surface Engineering Conference and Exhibition (HT&SE 2013) on 16-18 May 2013 at Chennai Trade Centre, Chennai, India. The 27th Surface Modification Technology (SMT-27) conference will be held together with the Surface Engineering.

- A special meeting will be organized in January 2013 to honour the members for 25years, (Fluidtherm Technology-Sustaining Member) 15 years, Mr. N. Gopinath and life members, Mr, DG. Sastri and Mr. V. Parthsarathy

- In house training programmes will be conducted for Tubes Investments India of Murugappa Group.

Welcome to New Members

- Sustaining Member. Dong Woo Surface Tech. India Pvt. Ltd., Sriperumputhur, Thiruvallur Dist. Represented by Mr. Kim Gin Tae

- Sustaining Member. Hard Castle Petroper Pvt. Ltd., 104, Moor Street, Chenai-600 001. Represented by Mr. Lalu George

- Sustaining Member AIEMA Technology Centre, Ambattur, Chennai – 600 058. Represented by Mr. Sai Sathiyakumar, President, AIEMA.
ASM International
Chennai Chapter

ASM International is the Society dedicated to serving Science and Engineering. Through a worldwide network, ASM provides educational, networking, and professional development opportunities to members and the materials community.

ASM International has more than 30,000 members worldwide, who are involved through the organized Materials Community as Engineers, Scientists, Technicians, Students and Educators. The ASM materials community promotes collaboration and the sharing of knowledge across all disciplines in the materials sector.

ASM is the home of the materials community, where the generations of materials professionals and engineers share ideas.

ASM International

Chennai Conference

Join us for the ASM International Conference in Chennai, India. The conference will be held at the Chennai Trade Centre from May 16 to 18, 2013.

The conference will feature a range of topics, including heat treatment, surface engineering, and more. Keynote speakers will discuss the latest developments in the materials industry, and there will be opportunities for networking and professional development.

Applications and submissions are now open for the ASM International Conference in Chennai. Visit the conference website for more information and to submit your application.

Support by:

ASM International

Chennai Conference

Visit the conference website for more information and to submit your application.

Heat Treatment and Surface Engineering Industry

Your Opening into India's Thriving Heat Treatment and Surface Engineering Industry

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HT & SE
Heat Treatment & Surface Engineering Conference & Expo 2013

21st Session & Technical Session - Part 2

Exhibition & Conference Highlights

1. Heat Treatment, Surface Engineering, and Heat Treatment Industry Technologies
2. Surface Modification Technology (SMT) - Indian heat treatment, surface engineering, and technology
3. Materials Processing & Test Equipment
4. Solenoid Valve Technology
5. Control Systems & Automation

Chennai Trade Centre, Chennai, India

May 16-18, 2013

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Individual Membership Options (select only one):

- **ASM Only** (includes a one-time $10 initiation fee, renews at $103 per year) ................................................................. $ 113
  An individual interested in receiving member benefits and supporting ASM.

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- **Material Advantage Student Membership (www.materialadvantage.org)** .............. $ 25
  A full-time, post-secondary student (College, University, Two-Year, Vocational, Technical) interested in receiving member benefits and supporting ACerS, AIIST, ASM and TMS.

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- **Chapter Sustaining Membership** (Rates vary per chapter. Call 1-800-336-5152, ext. 5651 for rate.) .............................................. $ ___
  A company, institution or individual interested in supporting local chapter efforts. Specify chapter _________.

Additional Affiliate Membership Options (check those you want to join):

- **HTS – Heat Treating Society (www.asminternational.org/hts)** ..................................... + $25
- **IMS – International Metallographic Society (www.internationalmetallographicsociety.org)** ...................................................... + $25
- **TSS – Thermal Spray Society (www.asminternational.org/tss)** ........................................... + $30
- **SMST – International Organization on Shape Memory and Superelastic Technologies (www.smst.org)** .................................. + $50
- **EDFAS – Electronic Device Failure Analysis Society (www.edfas.org)** ....................... + $25

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Simply complete this membership application and mail or fax to 440.336.4634. Questions? Phone 800.336.5152, ext. 0.

Mail payment to: ASM International, Member Service Center, 9639 Kinsman Road, Materials Park, OH 44073-0092.

Discover the many benefits of ASM membership today at www.asminternational.org

ASM International Chennai Chapter
No. 24, Lalithapuram Street,
Royapettah, Chennai 600014
Phone 044-28133093
• ASM International Chennai Chapter was awarded the 5 Star award for 2011-2012. The award was received by Mr. Sridharan
• Prof. M. Kamaraj was elected the Head of the Department of Metallurgical and Materials Engineering of IIT Madras
• Prof. M. Kamaraj and Dr. Srinivasa Rao Bakshi were awarded with a Certificate of Merit for International Activities by the Division of Materials and Processing of The Japan Society of Mechanical Engineers (JSME). This was in appreciation for their help in organizing the 3rd Asian Symposium on Materials and Processing (ASMP2012) on 30-31 August, 2012 at IIT Madras
• Prof. B. S. Murty delivered the 4th Dr. Placid Rodriguez Memorial Lecture on 25th October, 2012 in IIT Madras
• Prof. K. Prasad Rao was elected as Fellow of Indian National Academy of Engineering
• Prof. K. Prasad Rao was elected as Fellow of ASM International
• Dr. Bhanu Sankara Rao was awarded the 2012 National Metallurgist Award (Research and Academia) from Ministry of Steel during the NMD Golden Jubilee celebrations at Jamshedpur on 16th November, 2012.

Dr. U. Kamachi Mudali, Vice Chairman received DAE Group Achievement Award 2011 from the Department of Atomic Energy, Mumbai for the successful completion of nitric acid loop project and “Vocational Award” for Excellent Achievements in Nuclear Materials from the Rotary Club of Chennai Port City during October 2012.

Dr. Bhanu Sanakara Rao delivered the prestigious Daya Swaroop Memorial Lecture at the 50th NMD Award celebrations in Jamshedpur. His lecture was entitled Mysteries of Fatigue in the Sub-Crep Temperature Regime.

Mr. V. Parthasarathy, Past Chairman of Chennai Chapter and the Managing Director of M/s Wavecurrent Precision Parts Ltd. received the D & B – Axis Bank Business Gaurav SME Awards 2012 for their eminence in automotive sector under micro industry category at Bombay ITC Marathan hotel on 9th November 2012.

Dr. U Kamachi Mudali has been elected Fellow of NACE for 2012
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