



# ASM International, Pune Chapter Chapter News Letter

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## ASM PUNE CHAPTER WISHES ALL THE READERS A HAPPY DIWALI



Louis F Vaz

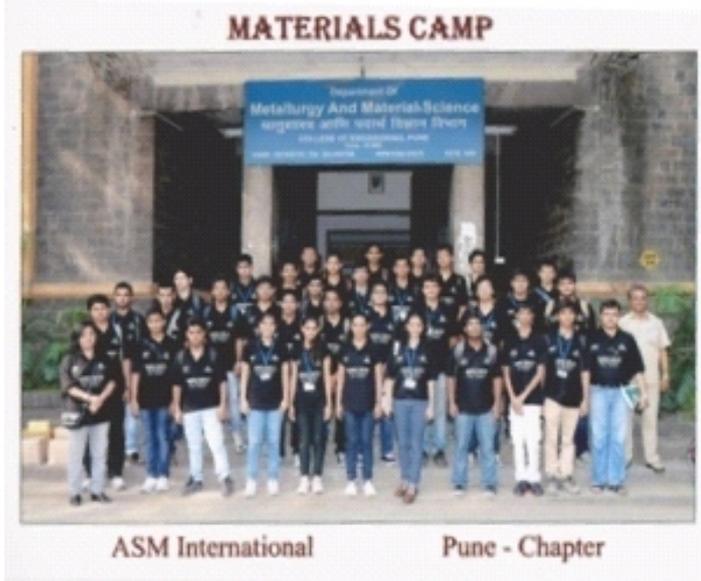
### EDITORIAL...✍

Editorial...  
ASM International, Pune Chapter Welcomes you to the October 2014 issue of Newsletter. Pune Chapter received the Chapter Award Category 1 In recognition of its outstanding achievement in the Area of Student Outreach. 7th Materials Camp for students was successfully held in May 2014. Annual Day was celebrated. Technical paper on Electroless Nickel plating in this issue. Failure Analysis Educational Course is scheduled from 6th to 8th November.



We are glad to inform you that ASM Pune Chapter, received the "Chapter Award category 1" from ASM INTERNATIONAL In recognition of its outstanding achievement in the Area of Student Outreach for the year 2013-2014.

Vice chairman Dr S M Arole participated in leadership days 2014 and received the award.



Participants of the 7th. Materials Camp

The 7th Materials Camp was held from 28th May to 1st June 2014, at the College of Engineering, Pune. Every year ASM Pune Chapter makes it a point to hold the Materials Camp In Pune. It is basically a camp for Students of Std. X to Std XII to learn more about Materials and ultimately get them to take a liking for Materials Science, as a Career. This year ASM International Pune Chapter, Automotive Research Association of India, Indian Society for Non Destructive Testing and College of Engineering, Pune jointly conducted the camp. The Camp was inaugurated at the hands of Dr. Raj Kumar Singh, Director, Kalyani Center for Technology & Innovation, Pune. The students were given hands on exposure to material testing like tensile testing, different types of hardness testing, different types of heat-treatment like normalising annealing and hardening,. Pyrometry was demonstrated .They also participated in the

different types of Welding, Use of Lasers was also shown for the first time,. Factory visits to industrial units like Tata Motors, Emitec Emission Control Technologies India Pvt. Ltd and ARAI were conducted. Mr. Sudhir Phansalkar, Mr. Rahul Gupta and team took great efforts to make the camp a success...



Mr. Chivate explaining the finer points of Tensile Testing



A Lazer machine is being shown.



## A technical presentation on "Measurement Uncertainty and Importance of performing traceable tests"

By Glen Pickering, International Sales Engineer ,Indentec, UK was held by ASM International Pune Chapter and Zwick GmbH & Co. KG, on 2nd June 2014. at Hotel Ashish Plaza, Pune.



Glen Pickering giving the technical talk

The topic covered the two types of measurement uncertainty in hardness testing, and discussed the determination of the uncertainty budget for depth measurement

(Rockwell) and optical (Vickers and Brinell) hardness test scales. Additionally, the importance of traceability and calibration chains to the validity of test results for agreed scales such as hardness were examined. Also Secrets of Successful Hardness testing, Automatic Testing & New Universal Hardness Tester ZHU250CL were discussed.

The presentation was well received, and there was a lot of interaction between the speaker and the audience.

## A Technical Presentation on New Gen Nitro-Carburising Furnaces

By Mr Otto Hunold, Manager - Engineering & Sales , Eliog, Germany was held at Hotel Pride, Pune, on 2nd July 2014. Mr. Hunold spoke in detail about Nitrocarburising furnaces which Eliog Germany have

been building. These furnaces are highly energy efficient and are available in gas fired and electric heated models.



Mr. Hunold is delivering the technical talk.

## Annual Day of ASM - Pune Chapter was celebrated on 25th August 2014.

Our Chairman, Mr. B.R.Galgali, welcomed the members and guests and presented the Vision for ASM, Pune Chapter.



Our Chairman, Mr. B.R.Galgali delivering the Vision of ASM Pune Chapter.



Dr. Dinesh P Amalnerkar , Executive Director, CMET, Pune was the Chief Guest and the Key speaker for the Annual Day.

Dr.Amalnerkar gave a very informative and educative talk on Integrated Electronics Packaging and Functional Materials @ Nanoscale, Below is a brief extract of his speech.

The nanotechnology boom has resulted in discovery of a host of forms of nanoparticles /nanoaggregates. These have lots of applications, particularly in magnetic materials, nanocomposites, nanodevices, chemical sensors, degradation of toxic chemicals, or even as possible carriers of isotopes for medical applications.

Nano-scale packaging would be the advanced and green process of interconnecting, powering, cooling, and protecting the nanocomponents made of nanomaterials to form electronic and bioelectronic systems for greatly improved functionality at reduced energy consumption and cost.

Nanoscale functional materials play a vital role in the development of green technologies as they form essential building blocks of such packages in the form of inductors, capacitors, resistors, optical assemblies, sensors etc

The pace of development going on at CMET, and as presented by Dr.Amalnerkar, kept the audience spellbound for 40 minutes.



A section of the members and invitees



Mr.K.C.Gogate receiving the award..



Dr. Amalnerkar delivering the talk

**A technical presentation on Kaleidoscope of Advances in Surface Engineering by Dr.T.S.Sudarshan was held by ASM Pune Chapter on the 25th August 2014.**



Dr.Sudarshan is the President and CEO of Materials Modiciation, Inc., USA. He is recipient of numerous awards and honors, including the Design News Award and R&D 100 for the microwave plasma technique" Nanogen" and for the Plasma Pressure Compaction technique and the Outstanding Young Manufacturing Engineer award from SAE. He is the coauthor of 175 publications and coeditor of 30 books including 28 books on surface modification technologies and holder of over 20 patents and has given over 40 plenary and keynote lectures throughout the world.

He gave a very illustrative presentation and provided a generic overview of the significant implications that Surface Engineering has had in society and the most recent impact it has had technologically. He also gave examples of how man is copying nature for making technological advances.



Dr.T.S. Sudarshan giving his technical presentation.

### Training Programme on Basic and advance Heat Treating

was organized from 26th to 28th August 2014 by ASM INTERNATIONAL PUNE CHAPTER in Pune. The progamme was aimed at The Heat Treaters, designers, academicians, users of Heat Treating industry.Mr. K.C.Gogate and his team of able academicians and heat-treatment experts helped in making the three day progamme a great success.



Training session in progress.

### Technical Article on Electroless Nickel Plating

By Dr. Manohar Totlani

Electroless Nickel (EN ) plating is used to deposit nickel without the use of an electric current. The coating is deposited by auto catalytic chemical reduction of nickel ions by hypophosphite (deposits being Ni-P )'amino borane or borohydride compounds ( deposits being Ni-B alloys )or hydrazine hydrate ( deposits being pure nickel ).p in the EN deposits vary from 1 to 12 percent, B from 0.1 to 8.0 percent depending on the bath formulation, bath pH and bath age. In general in commercial practices EN thicknesses range from 2 .5 to 125 microns .It must be remembered that EN is not a single coating but a group of coatings ,proper care should be taken in selecting EN coating keeping in view the end application.

EN has unique engineering properties and thus used for functional applications only and very rarely for decorative uses. The primary criteria for using EN generally falls into the following categories.

1. Corrosion Resistance
2. Wear and anti-galling characteristics
3. High hardness, 500 to 950 VHN in the as-deposited state.
4. Lubricity
5. Solderability and bondability
6. Uniformity of the coatings, irrespective of geometries
7. Adjusted electrical and magnetic properties
8. Can be plated on non-conductors ( ceramics, plastics, )



9. Can be plated with zero or compressive stress in the deposit

EN is a nano crystalline coating e.g. Grain size of as deposited Ni-P coating varies between 10-12 Å to 150 Å (1-1.2 to 15 nm) depending on the P content in the deposit.

### Corrosion Resistance

EN Ni-P coatings are being increasingly used in corrosive environment applications ranging from transportation equipment, storage vessels, and in-line production equipment such as pumps, valves and tubing, aerospace, defence and electronics industry. EN coatings can withstand the corrosive environments encountered in oil and gas wells. More importantly the holidays ( pores and scratches ) are not the sites for accelerated corrosion, even when sulphide is present in the crude oil. EN coatings, are being successfully used for corrosion protection of all the boiler works -heat exchangers, compressors, valves, ducts etc, against highly corrosive fluoride vapours by the French Atomic Energy Commission. Materials engineers are looking at EN coating as a potential cure for many unresolved corrosion problems.

EN Ni-P coated OFHC copper discs, diamond polished after plating, are being used as laser cavities. Beryllium and Al alloys EN coated metal optics is being used in outer space.

EN Ni-P coatings have the ability to get hardened by post plating heat treatment at temperatures greater than 240 deg centigrade, which is due to precipitation of the co deposited P as nickel phosphide. During heat treatment, the deposits undergo shrinkage in volume in high and medium P deposits, which may cause cracks through the coating particularly when the micro hardness exceeds 900 VHN. This impairs the corrosion resistance of such heat treated EN deposits.

Low temperatures, around 200 degree centigrade provides the optimum corrosion resistance to mild and carbon-steels. the coating also becomes a little denser. the denser atomic packing increases corrosion resistance.

### Hardness and Wear

Co-deposited particles of diamond, SiC, PTFE etc in a EN coating are the recent composite coatings that have extended the tribological applications of EN. During wear, the sliding surface usually rides on the particles and slides over the matrix. Thus wear characteristics of these coatings approach that of the particles. EN-PTFE composite coatings give a self-lubricated surface.

### Nickel - Boron Coatings

The most recent EN coating is the Ni-B coating containing 5.5 to 6 percent B. The coating after post plating heat treatment at temperatures of 375 to 380 degree centigrade gets converted into nickel boride coating.

Borohydride ion is the most powerful reducing agent available for EN deposition, operating pH is 13-13.5 and temp. is 95 degree centigrade. Thus EN deposition is a low temperature route for getting boride coatings.

These are very hard coatings and thus ideal for wear applications.

EN plating is thus a versatile process capable of solving many problems in a variety of engineering industry.

### About The Author

Dr M.K. Totlani is doctorate in Metallurgical Engg from I.I.T. Bombay, Mumbai. Retired on superannuation from B.A.R.C. ,Mumbai, where he was heading Surface Engg. Activity. He has published over 180 research, review papers and has edited books on Corrosion, Coating Technology, Chemical Metallurgy ,Applied Electrochemistry ,Electrochemical Instrumentation etc.

Has won a number of awards for his many sided contributions and was honoured by the Govt. of Rajasthan in the year 2000 for his contributions to Nuclear materials Technology, and Corrosion and Tribology.



## Failure Analysis Educational Course

Pune Chapter is organizing an Educational course on "Failure Analysis" on 6th to 8th November 2014 at Hotel Pride Executive, Shivajinagar Pune. The topics to be covered are General Procedures for Failure Investigation, Types of Failure and Stress, Ductile & Brittle Failures, Fatigue Failures, Wear Failures and Corrosion Failures. Additionally many case studies of failures of Gears, Shafts, Bearings, springs and Fasteners from Automotive and Engineering industries, would be discussed. Faculty members are eminent metallurgists known for their contribution in Automotive and Engineering industries for the past 30 to 45 years. The course is designed for the Engineers and Technical professionals who would learn to adopt systematic approach to Failure investigation by learning underlying theoretical principles, various failure mechanisms and their identification by various means and practical knowledge from discussion of case studies by a team of faculty members whose combined industrial experience exceeds 250 years. Participants are encouraged to bring along their failure cases for discussion.

All are requested to avail of this golden opportunity by either participating or by deputing their staff for this long awaited course.

A Message from Mr. Prem Aurora Chair, ASM Intl. India National Council  
Dear All,

We are privileged to be nominated as the team of India National Council for the next three years 2014-2017. We are also thankful to all of you for having

accepted us to be leading the activities of ASM in this part of the world.

As we take over as the new team, we have challenges in front of us the biggest challenge being 'Creating a brand image of ASM International'. We propose to take following measures for this:

Having periodic activities related to materials and metallurgy in various parts of the country where we do not have our presence so far, as also in areas where chapters are present, to promote the activity of the chapters & strengthen their presence.

Have a common Newsletter of ASM India wherein we will focus the activities of all chapters. This will improve coordination among the chapters

Promote retention as a mantra for development and hence request all chapters to bring back to the fold members who may have gone away in the past.

Start a membership drive all over India to bring the strength of ASM on par with other professional associations.

As is said, united we stand and divided we fall. We propose that all communication with H.O. should be routed through the council. This way we can bring in focus various issues faced by chapters in India, be it the issue of identity cards, membership fees, ASM- IIM lecture

series, so on and so forth. Propose to do major events in India under the council with opportunity for all chapters to participate and generate funds for their chapters.

As a beginning, the event being organised by ASM India chapter MET-14 + HTSat Gandhinagar, Gujarat from 4th to 6th Dec. 2014 is being supported by all chapters of ASM and in turn they will be

benefitted monetarily to the extent of support provided.

To give a gist of the mega event, there is an exhibition which will cover approx. 4000 sq. mtrs. area, the largest ever by ASM in India; there are three parallel conferences being programmed which will focus on Emerging materials for industrial applications, Characterization of



materials and

Advances in heat processing. The target set for conference is around 1000 delegates which if achieved will also be the first time ASM has had such a large patronage.

Fruits of this event will be visible in near future, as we will have a wide spectrum of visitors, delegates and exhibitors, who will be potential members of ASM International & will benefit all chapters in India. We will and we can achieve the membership development targets we have set up for ourselves but, not without the support of you all members and chapters. We also draw your attention

to the scheme of Each One Get One Member, floated by H.O. one month back. This scheme is available for 5 more months only. In this, each chapter is eligible for awards as per % increase in their membership. So all chapters wake up and send in the information to H.O. every month on increase in your membership, to avail of these benefits. The final reward is worth \$3500/-

We believe in empowering the individuals which will take us to greater heights and make us a force not just in India but across the globe & who will be heard by H.O. in years to come.

With best wishes to the Pune chapter for having done an excellent job in the past and hope they will continue to do so in future.

Prem Aurora Chair, ASM Intl. India National Council

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## Appeal from ASM Pune to Members

ASM international sends AMP (the monthly magazine) to Members. Those who are not getting AMP, Please send email to ASM International Pune Chapter.

"Members who have not paid their Annual Membership fees may please do so."