

International Seminar & Course

Surface Engineering for Industrial Applications

24-25 March 2010

**Chennai, Tamil Nadu
INDIA**

Organized by

SURFACE TECHNOLOGIES
(Chennai)

In association with

A-IATS



Please refer www.a-iats.com for new details

Surface Engineering Relevance

There has been a paradigm shift in **surface engineering** in recent years from traditional electroplating to leading edge thin & ultra thin surface finishing processes assisted by advanced sources like plasma, laser, ion, electron, pulsed arc, spark and microwave energies. The scope and potential of **interdisciplinary surface engineering** have thus grown into a wide range of applications which includes critical components from almost all major industries such as automotive, power, steel, **aerospace**, nuclear, **biomedical**, petrochemical, **clean energy** and electronic systems.

This inaugural seminar on the Surface Engineering for Industrial Applications provides an **overview of technology trends**, development challenges in methods, materials and applications in surface engineering arena with special emphasis on upcoming technologies for new cluster industries. However, the short courses discuss the, comprehensive applications and an update on the understanding of metal finishes and **precious plating and analysis in electronics and automotives landscape**.

The primary purpose of the seminar is to bring together the surface engineering professionals and the end users of surface finishing and associated technologies in Chennai, Tamil Nadu (INDIA) for R&D and business collaboration initiation through global partnership. **The seminar will be conducted on Thursday, 25th March 2010 from 9:00 am to 5:30 pm.**

Speakers & Presenting organization

Keynote :

Engineering for Nanostructure Surfaces

Prof. R Gnanamoorthy,
Deputy Director, IIITD&M
Kancheepuram, Chennai

- * Ni-free, Non-toxy, High Corrosion Resistant W-based Plating
- Dr. Hee Taek yum, Korea Surfin Technology (Korea)
- * Developments in Line Conduction on Crystalline Solar Cells
- Mr. Steven A Burling, Metalor (UK)
- * Surface Engineered Nano Bioceramic Coatings for prosthetic Hip and knee Joint Replacements
- Dr. T M Sridhar, SMK Fomra Institute of Technology (Chennai)
- * Opportunities for Surface Finishing in MRO of Aerospace Landscape
- Mr. R. Balakrishnan, STAerospace (Sin)
- * Surface Engineering of Bioimplants: A Solution to increase its lifespan
- Dr. Geetha Manivasagam, VIT University (Vellore)
- * - Dr. Rangaswamy, Director Technical, Sulzer Metco – USA
- * Reducing Rejections in Electroplating and Surface Finishing
- Mr. Santosh Rane RRR Labs (Mumbai)
- * Surface relevance and its impact at semiconductor process and package development
- Dr. R. Gopal Krishnan, Surface Technologies (Chennai)
- * - Mr. Tony Evans (PAL, HK)
- * Electroless Plating
- Dr.T S N Sankara Narayanan
NML, CSIR (Chennai)

Education Course

Surface Engineering is an integration of applied sciences and engineering and hence currently there is a need to educate and train scientists and engineers at various levels -technicians, graduate and postgraduates in multidisciplinary areas. The Course will be conducted on 24th March from 9:00 am to 1:00 pm.

a) Mr. Steven Burling of Metalor (UK) will conduct the course on “Precious metal plating for Electronic and automotive Applications”.

Outline:

For platers/non platers requiring a general understanding of Precious Metal Plating, its benefits and its applications. All precious metals will be discussed (Gold, Silver, Palladium and its alloys, Rhodium, Platinum and Ruthenium. Applications for these metals will be discussed as well their cost implications and calculations. Formulation information and the roles of process constituents will be covered. Operating conditions for high speed, rack/vat and barrel plating will be presented and well as process control (analysis and plating test methods). Environmental and legislative issues will also be covered.

b) Dr. GOPAL Krishnan of A-IATS (Singapore) will conduct the course on “Advanced Analytical Technology and Applications to Surface Engineered Coatings”.

Outline:

Analytical support has played and still plays an indispensable role in material & process research, process development, defect free manufacturing and reliability. Advanced analytical tools and specialized methodologies have been providing facility to leading edge research labs and regional manufacturers to link composition, structure, morphology, roughness, hardness and adherence with defect reduction, yield improvement and optimum performance enhancement. In this course, the principle and application of analytical tools such as TEM/EELS, FIB & SEM/EDX, Micro Raman, X-ray imaging, XRD, XRF, XPS, AES, D-SIMS, AFM, RBS, PIXE, NRA, FT-IR, GC-MS, TOF-SIMS, AAS, ICP-OES... are briefly described with particular emphasis to engineered coatings for scientific research and industrial applications. More details are at https://www.researchgate.net/profile/Gopal_Krishnan2

Organising Committee

General Chair : R, Gopal Krishnan, Surface Technologies
Vice-Chair : Mrs. Sudha Subramaniam
Convergence Business Solutions.....

Advisor : Dr.Sudarshan, Matmod, USA.....

Members :

Dr. KS Rajam, NAL(Bangalore).
Dr. T S N Sankara Narayanan, NML, CSIR, (Madras)
Dr. T M Sridhar, SMK Fomra Institute of Technology (Chennai)
Dr. Geetha Manivasagam, VIT University (Vellore)
Dr. R. Gopal Krishnan, A-IATS (Singapore)
Mr. C P Kam , SSEA (Singapore)
Dr. HT Yum, Unitel (Korea) & IUSF

Secretariat

The symposium is organized by the Surface Technologies (Chennai) and managed by their Secretariat. All written correspondence should be addressed to:

1st SEIA2010 Secretariat
The Surface Technologies
G7, Mahalakshmi Apartments, No 5, Ram Chandra Street
Ambathur, Chennai- 600053, Tamil Nadu, INDIA
Attn: Mrs. Subra , Tel: 9176930405

Technical Clarification

Email : SEIA10_Chennai@a-iats.com

Exhibition

A Table Top Exhibition will be held in conjunction with the seminar. The exhibition opens at 10:00 am on Wednesday 25th March and closes at 5:30 pm. Every exhibitor is eligible for a free registration either for the course or the seminar.

Sponsorship

Those who are interested in contributing are requested to contact the secretariat for more details.

Target Industries & Audience

Technical officers, Engineers, Managers, R&D personnel, company CEOs, graduate students, engineering college lecturers and all those engaged in the Surface Finishing/Engineering Industries and allied technologies.

Surface Technologies reserve the right to change/postpone any part of this final programme modified on 20 Feb 2010.

Registration

All participants are required to register and make payment by 10 March 2010. Please register and send a crossed cheque or bank draft payable to “The Surface Technologies” and post to 1st SEIA2010 secretariat. The registration fee shown below is indicated in INR and the estimated value for INR 47.00=1US\$

Registration fee (INR) for Seminar and Exhibition on 25th March 2010*.

	on or before 10 th Mar 10	after 10 th Mar 10	on-site registration
Member	2,000	2,500	3,000
Non-member	2,500	3,000	3,500
Student (full time)	1,500		
Exhibition	5,000	10,000	

Registration fee for Courses on 24th March 2010**

	on or before 10 th Mar 10	after 10 th Mar 10	on-site registration
Member	1,500	2,000	2,500
Non-member	2,000	2,500	2,500
Student (full time)	1,000		

* The full day session includes one luncheon, two tea breaks, and one abstract booklet and one seminar Proceedings in CD-ROM.

** The half day session includes one luncheon, one tea break, and one hardcopy course notes.

- A 10% discount will be given for group registrations of 3 or more participants from the same organization.
- A 10% discount will be given for participant attending both the Course and a course.
- Discounts are not applicable after 10th March 2010.

Venue

The Residency Towers
115 Sri Thyagaraya Road
Chennai-600017
Tel : (91) 44- 2815 6363
Fax : (91)44- 2815 6969
<http://www.theresidency.com>

About the Speakers and their presentation outline (Partial)

Prof. R. Gnanmoorthy, works on design and development of novel test machines, machine elements, product design, new engineered surfaces, fatigue, fracture & tribo behaviour of advanced materials.
More..details..are..at
<http://www.iitdm.ac.in/gnanamoorthy.html>

Dr.T S N Sankara Narayanan, currently works at NML, CSIR complex with focussed interest at Electrochemistry, Engineering, Materials chemistry, Materials science, Nanotechnology.... More details are at
https://www.researchgate.net/profile/Sankara_Narayanan_TSN

Prof. Geetha Manivasagam currently works at VIT University after her post doctoral fellowship in Clemson University. She has guided many masters and PhD students and travelled widely for presentation at conferences.

Outline: Surface engineering of biomaterials is one of the vital areas, as it enhances the longevity of an implant and thereby the quality and life span of human beings. The technology associated with this field has now become a multi-million dollar business as the number of implant surgery has increased drastically owing to swell in aged population all over the world. However, the failure of the implants due to the tribo corrosion and reduced biocompatibility is a major issue. Surface of the implant which directly interacts with the human tissue plays a major role in deciding the above said properties. This talk will cover the importance of surface engineering in the field of biomaterials and the research carried out by our group in this direction. The recent advances in surface engineering using especially the advantages of non materials will also be presented

Prof. Hee Taek Yum, Ph.D., FIME: Currently CEO of Korea Surfin Technology Co., in Korea, and engaging on developments of metal finishing process and consulting various metal finishing companies in world wide in technically and also on developing technologies and sales of chemicals. Graduated Metallurgical Department of Seoul National University, and received Ph.D. from this university, and engaged as a professor of this university for 23 years. Created Koren Institute of Surface Engineering (society) at 1963 and followed by working as a president of this institute for 9 years. Therefore now Honorable President of this Society. Written about 5 books on metallurgical and 5 books on metal finishing, and using those books widely as textbooks of universities and colleges as well as surface finishing engineers.
At present, President of IUSF(International Union for Surface Finishing), and hosted INTERFINISH 2008 in Korea as a chairman.

Outline: Nowadays, plating industries are to be eco-friendly, without having hexa-valent chromium, cyanides nor Ni. Therefore Ni-free, non-toxic plating processes are strongly required for electronic devices, like mobile phone, as well as other industries of automobile and jewelry, In those respect, Ni-free W based alloy plating baths, non-toxic, near neutral, without included cyanides, unlike the conventional Ni-free Sn-Cu-Zn alloy bath, are dealt with in this presentation. And also other W based alloy baths developed in our laboratory, high corrosion resistance and wear resistant alloy plating, such as Ni-W, W-Fe, W-Co, Mo-Co alloy baths of both electrolytical and electroless plating processes are also presented. Particularly, those baths are very easy to maintain by means of checking simply specific gravity(Baume) and adding replenishers respectively upto given specific gravity.

Prof. T.M.Sridhar presently is Professor and Head, in the Department of Biomedical Engineering, at SMKFIT. Previously he was also heading the Biomedical Engineering Department at Sathyabama University, Chennai, India for 3 years. Prior to this, he was awarded the Pikovsky Valachi Post Doctoral Fellow at the Faculty of Engineering, Tel-Aviv University, Israel.

He is from Chennai (Madras), obtained his M.Sc. Analytical Chemistry - Instrumentation in 1995 with University Second Rank from the Department of Analytical Chemistry, University of Madras, and In 1996, he joined the Ph.D program at University of Madras and worked on the development of bioceramic coatings for biomedical devices at Indira Gandhi Centre for Atomic Research under the guidance of Dr.U.Kamachi Mudali. He was awarded Ph.D for his thesis entitled "Synthesis, electrophoretic deposition and characterization of hydroxyapatite coatings on type 316L SS for orthopaedic applications." He was awarded Best Ph.D Thesis award 2001-02 by NACE International (Houston, USA), India Section in 2001. He was awarded Junior Research Fellowship (1996) by Department of Science and Technology (DST) and Senior Research Fellowship (1997) by Council of Scientific and Industrial Research (CSIR), New Delhi, India for carrying out his research projects.

In January 2002, he joined the Faculty of Engineering, Department of Solid Mechanics, Materials and Systems, Tel-Aviv University as a Pikovsky Valachi Post doctoral fellow with Dr. Noam Eliaz. He is currently involved with the development of new osteoconductive functionally graded hydroxyapatite coatings on Ti6Al4V by electrochemical deposition and its invitro and invivo characterization, Signal and Image processing and various aspects of Biomedical Engineering. He is also involved in the development and evaluation of NiW alloys for high temperature applications. He has been awarded an IGCAR sponsored research project on "Zirconia coatings for pyrochemical applications" (2006).

He is a life member of several professional societies – SBAOI, SAEST, BMESI, ISTE etc and is currently the Executive Committee Member, Society for Biomaterials and Artificial

Organs, Chennai Chapter (2005-2008) and NACE International India Section, South Zone (2006-till date).

Outline: A plethora of synthetic and natural biomaterials containing different properties are available for use in various clinical and biomedical applications. Biomaterials have been used in many forms as prostheses, implant materials, matrices for guided tissue engineering, biosensors, microfluidic devices, and scaffolds and many more. The development of biomaterials for the repair or replacement of hard tissue is a challenging and a promising area of research. The chemical stability, mechanical behaviour and biocompatibility in body fluids and tissues are the basic requirements for the successful application of implant materials for bone fractures and replacements. Corrosion is one of the major processes affecting the life and service of orthopaedic devices made of metals and alloys used as implants in the body. Among the metals and alloys, stainless steels (SS), Co-Cr alloys and titanium and its alloys are widely used for the making of biodevices for extended life in human body. Incidences of failure of stainless steel implant devices revealed the occurrence of significant localised corrosion attack viz., pitting and crevice corrosion. Titanium forms a stable TiO₂ film which can release titanium particles under wear into the body environment. The major challenge facing the development of the next generation of biomaterials is the need for more complex biological functionality and improved biocompatibility. To reduce corrosion and achieve better biocompatibility, bulk alloying of stainless steels with titanium and nitrogen, surface alloying by ion implantation of stainless steels and titanium and its alloys are a few alternatives along with bioceramic surface coatings.

Surface modification of alloys with bioceramic coatings are considered as potential ways of improving the performance of orthopaedic devices. Bioceramics have been used very successfully within the human body for many years. They are commonly used in orthopaedic surgery and dentistry but they are potentially suitable for a wide range of important applications within the medical device industry. Hydroxyapatite (HAP) is the main inorganic bioceramic constituent of bones and teeth. HAP possesses both bioactivity and osteoconductivity which make it a very attractive material for biomedical applications. However, the material has limitations in forming complex shapes with controlled microstructure and poor mechanical properties. Hence, HAP has been used as coatings on metallic prosthetic implants with the dual purpose of accelerating osseointegration and the underlying base metal the mechanical strength. Of the diverse deposition techniques EDP (Electrophoretic deposition) and EC (Electrochemical deposition) represent important technological alternatives due to rapid coatings production, high reproducibility and the low cost of process. These coatings are traditionally subjected to heat treatments for consolidation above 800°C. Sintering generally results in changes in the phase purity of HAP and impurities. An option to optimize the sintering temperature is to obtain coatings in green state with well packed HAP nanoparticles. These nano materials have a more effective atomic diffusion during sintering allowing complete unification among particles to relatively low temperatures.

Mr. Santosh P Rane obtained his Bachelor's Degree in Science with Honours from the University of Bombay. Subsequently, he obtained a Diploma in Business Management from the University of Bombay. He joined M/s Grauer & Weil (I) Limited as a Field Chemist and was responsible for trouble shooting, technical marketing and establishment of new plating plants in various parts of India. Following the commencement of RRR's activities, Mr. Rane resigned from his position at Grauer & Weil after a five-year stint, although he was retained as a consultant for two more years.

Mr. Rane has wide experience in the design of manual, semi-automatic and automatic tailor-made electroplating plants for various types of substrates and components, establishment of process sequences, jig design, wire-cut machining and trouble-shooting. He has put many innovative ideas into practice in the field of electroplating, electrophoretic lacquering and surface finishing and is well known in the field both in India and abroad. Mr. Rane became a member of the Metal Finishers' Association of India in 1974 and was the Honorary Joint Secretary of the MFAI for several years. He has been instrumental in organizing, on behalf of the MFAI, the MFAI exhibitions at IIT Bombay in 1997, Delhi in 2002 and Mumbai in 2006. Mr. Rane is also a member of the Bombay Cricket Association.

Outline: Rejection during the process of electroplating / surface finishing is a major cause for concern. In order to streamline product quality and assure batch to batch consistency, various factors must be considered. These include size, shape, geometry, quantity and type of substrate; inspection before, during and after plating: correct process sequence and in line controls; pre-treatment, rack design, type of plating and bath chemistry, and post treatment as well as packaging. Controlling these factors enables significant reduction in rejections. All the above factors will be discussed in detail.

Steven Burling's Presentation: In this rapidly changing environment the drive towards sustainable energy is still growing and new technologies are emerging. One such technology "Photo Voltaic / Solar" energy continues to evolve. Traditionally the wafers used, in this market, have been screen printed with a silver paste to form a silver conductor when fired.

New technologies in the method of achieving line conductivity using, screen printing, ink jetting and electroplating have developed. The changes in these applications are leading to increased efficiencies in the transference from Solar Energy to Electricity.

This paper/presentation will look at these technologies, how developments have emerged to satisfy this need for increased efficiency and the links now between the technologies. In particular how plating can be used in this growing market. The use of some newly developed silver processes which exhibit some environmental benefits will also be discussed.

Mr. Tony Evans has been employed by Process Automation International (PAL) in Hong Kong for the last 13 years. At present he is responsible as Vice President and General Manager for the operations of a member company of the PAL Group, PAL Surface Treatment Systems Ltd., His career started in plating in 1974 when he joined Engelhard to be involved in the Precious Metals Electroplating field working in a variety of jobs and roles. After working for Engelhard he also spent time with Enthroner, Schering and Attach before joining PAL in 1995. His previous role with PAL was International Sales and Marketing Manager for the PCB Group. He has presented papers at various seminars and conferences as well as writing papers for industry related publications. He is a member of the Institute of Metal Finishing in the UK and Hong Kong .

Mr. R Balakrishnan is the Vice President (Operations Engineering Department) of the Engineering and Development Centre (EDC). EDC is the engineering and development division of Singapore Technologies Aerospace Ltd (ST Aerospace) that provides customised upgrade and engineering solutions for military and commercial aircraft. ST Aerospace is the aerospace arm of the public-listed Singapore Technologies Engineering Ltd (ST Engineering). He is responsible for the operations of Engineering Services, which plays an integral role in supporting ST Aerospace's Total Aviation Support programmes for customers. Engineering Services' support includes Design engineering, Modification reviews, maintenance engineering, technical and airworthiness document review, aircraft configuration control, reliability reporting, power plant health monitoring, aircraft performance monitoring, defect analysis and control, and engineering design. He began his career with ST Aerospace as a Mechanical Engineer in 1976. Since then, he has held various appointments and management positions in Engineering Services and Programme Management, amongst others. He was also Programme Manager for several structural and avionics upgrade programmes.

He holds a Bachelor of Science (Mathematics, Physics and Chemistry) from Madras University in India and a Bachelor of Technology (Aeronautical Engineering) from the Madras Institute of Technology in India. He also attended numerous general and type courses. He enjoys reading, golfing, sports and travelling.

About the Course Instructors

Steven Burling FIMF. Currently employed by Metalor Technologies UK as Sales and Marketing Manager, Northern Europe for the Advanced Coatings Division. Responsibilities, apart from sales & marketing, include the introduction of new precious metal plating processes to the European Market as well as liaising with colleagues in USA and the APAC regions. Started career in plating in 1969 working on the original trivalent

chrome developments and later working on the development of hard gold plating using ultrasonic agitation. Since 1979 employed by Engelhard, later to become Engelhard-Clal and which since May 2002 has become a part of Metalor Technologies. Presented many papers at various NASF SurFin conferences since 1999 related to precious metal plating. Currently President of the International Branch of the NASF. Has also presented papers at conferences in Europe and presented papers at all the SEIA conferences in Singapore. Qualified as a graduate from the Southbank University in 1978 and last year celebrated 40 years in the Metal Finishing industry.

Dr. Gopal Krishnan : Graduated in Physics from National University of Singapore and currently works as Technical adviser and consultant supporting Scientific Research and Industry Technology Development through advanced analytical technologies and road mapping. He has published a number of research papers with colleagues and students in electronic materials science area in international journals, conference proceedings and had travelled widely for technical presentation through his work experience at NUS Physics Department, A*STAR and professional associations. He has also consulted many companies in this region for their analytical & test needs.

He has organized a number of technical courses and symposium in various capacities and the professional groups such as Singapore Focused Ion Beam Applications Group (SFAG/2001) ,Singapore Surface Analysis Interest Group (SSAIG/2002), Singapore Analytical and Test service Providers Group (SATS-PG/2003), Singapore Industrial Plating Group (SIPG/2004) , Singapore TEM user Group (STUG/2009) initiated by him are evolving and popular with industry and academic circles. He has founded A-IATS(Singapore/2009) and Surface Technologies(Chennai/2010) and plays a Technical advisory role.

He is/was a member of Institute of Physics (Singapore), Singapore Surface finishing Society, AVS, ASTM, NASF, International Institute of Forecasting (USA) and SICCI. He has been the Symposium and conference General chair of Surface Engineering for Industrial Applications for 2005-09 and the upcoming International conferences of ASIA Interfinish 2010 with 10th ICASE/Japan, 5th SISE /China (19-22 Oct 2010). He has been actively involved in the planning and the bidding process of Sur/fin(USA) for 2012 and FCMN(USA) for 2011 at Singapore. Contactable through dr.gopal@aseansurfin.org or https://www.researchgate.net/profile/Gopal_Krishnan2/

About the Organizer and the Associates

Surface Technologies (Chennai/India)

*A newly established business division of **Convergence Business Solutions** at Chennai in 2010 focusing on the products & services related to Surface Finishing and Engineering Technologies coupled with market development..*

A-IATS(Singapore) Pte Ltd

A-IATS, as your first port of call addresses your analytical and test challenges on continual basis with its physical assets and intellectual capital arising from research labs and regional manufacturers. AIATS enables you to link composition, structure, morphology, roughness, adhesion and hardness with defect reduction, yield improvement and optimum performance enhancement for variation management.

Besides the Analysis & test wing, the Events Management division is also actively involved in the promotion of Science & Technology- centric activity. More details are at <http://a-iats.com/>

SSEA (Singapore)

The Singapore Metal Finishing Society was founded in November 1981 with the mission to promote the development of the local electroplating industry. It was renamed the Singapore Surface Finishing Society (SSFS) in 1992 and as Singapore Surface Engineering Association in 2009. In 1994, we included PCB manufacturing as an integral part of our activity and admitted PCB manufacturers as members. More details are at <http://www.aseansurfin.org/>

Registration Form for 1st SEIA2010_Chennai (24-25 March 2010)

Name (Prof/Dr/Mr/Ms) _____

Organization _____

Mailing Address _____

Tel / Fax: _____ Email: _____

Member: Yes _____ No _____ Details: _____

Registration fee details in INR	No. of participants	Total INR
a) Seminar on 25th March 2010		
b) Industry Course/s on 24th March 2010		
c) Table Top Exhibition		
d) Sponsorship (INR 2,000.00 minimum)		
Total amount payable		
Remarks:		

Please complete the enclosed registration form and send a crossed cheque or bank draft payable to "The Surface Technologies" for delivery to the Secretariat.

Payment details:

Enclosed Cheque/Bank Draft no: _____ for INR _____

Name: _____ Signature: _____

Please email, or mail the registration form

**1st SEIA2010_Chennai Secretariat,
The Surface Technologies
G7, Mahalakshmi Apartments, No 5, Ram Chandra Street
Ambathur, Chennai- 600053, Tamil Nadu, INDIA**