3rd International Conference on Materials Processing *for* Properties and Performance

MP3

2004

24 – 26 NOVEMBER 2004

ORCHARD PARADE HOTEL

SINGAPORE

Incorporating

11th Institute of Materials, East Asia Annual Conference

(24th November)

Organized and Sponsored by:

Institute of Materials (East Asia)

Co-Organized by:

School of Mechanical & Production Engineering

A*STAR Singapore Institute of Manufacturing Technology

School of Materials Engineering

Supported By

Nanyang Technological University

SCOPE:

The 3rd International Conference on Materials Processing for Properties and Performance (MP^3) will be held in **NOVEMBER 24-26, 2004**. It is sponsored by the Institute of Materials (East Asia) and co-organised by Nanyang Technological University (MPE, NIE, EEE & SME) and Singapore Institute of Manufacturing Technology. The purpose of this annual inter-disciplinary conference is to bring together state-of-the-art developments on all aspects related to the processing of advanced materials spanning the entire spectrum of metallics, ceramics, composites, polymers, magnetic and electronic materials as well as coatings. The conference will certainly provide an attractive forum for presenting the *latest advances* in *materials processing and materials evaluation* by researchers and engineers from industry, research laboratories, and academia. Both INVITED and CONTRIBUTED papers will be included. Invited papers speakers in "leading-edge" academic and industrial research settings, in related areas, will provide a lucid and comprehensive overview of the current status and potential future directions for research. Contributed papers will attempt to cover specific problems in the same areas. The topics of interest include, but are not restricted to:

- *International Symposium on Shape Memory and Related Technologies – SMART 2004*
- *Symposium on Biomaterials for the 21st Century*
- *Materials in Devices and Systems – MIDAS 2004*
- *Advanced Moulding and Forming Technologies*

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School of Mech & Prod. Engrg
NTU
And
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Institute of Materials (East Asia)

A/Prof. P. Hing
School of Materials Engineering
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Dr. L. G. Yu	School of Mechanical & Production Engineering, NTU

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E S W Kong (Nanophotonics Semiconductors, Singapore)
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P. Kennedy (Moldflow Corporation, USA)
F. Klein (Fachhochschule Aalen, Germany)
K. Kondo (University of Tokyo, Japan)
J. P. Qu (South China Univ of Tech, P R China)
H. Wehr (IKV, Aachen Technical Univ, Germany)
C. Y. Yue (Nanyang Technological Univ, Singapore)

Programme Schedule for the 3rd International Conference on Materials Processing for Properties and Performance (MP3 - III)

Day 1: 24 November 2004, Wednesday
(Featuring 11th Annual Conference of Institute of Materials, East Asia)

	Time	Programme			
	8.00 – 8:40AM	Registration			
	8:45 – 8.55AM	Opening Remarks & Welcome Speech by A/Prof K. A. Khor (Organising Chairman, 3rd MP3, and President IOM, East Asia)			
	9:00 – 9:30AM	**Keynote Talk #1** – Prof. S. Mahajan: **ROLE OF MATERIALS SCIENCE IN MICROELECTRONICS: PAST, PRESENT AND FUTURE**, *Arizona State University, USA*			
	9.30 – 10.00AM	**Keynote Talk #2** – Prof. Vijay K Varadan: **Applications of wireless microsensors and MEMS in engineering and medicine. Can we get smarter?** *Pennsylvania State University, USA.*			
	10:00 – 10.30AM	**Keynote Paper#3 –** Prof. Peter Marquis**: The potential of nanocomposites as biomaterials in medicine and dentistry.** *University of Birmingham, UK*			
	10:30 – 10:50AM	Welcome Reception - Tea Break			
	10.50 – 11.20AM	**Keynote Paper #4 –** Prof. Masahiro Yoshimura: **Direct Fabrication Of Functional Ceramic Films And Patterns By Soft Solution Processing Without Post Firing** *Tokyo Institute of Technology, Japan*			
	11:20 – 11:50AM	**Keynote Paper #5 –** Prof. Z.A. Munir: **Fundamental Investigation of the Characteristics of the Spark Plasma Sintering/Synthesis (SPSS) Process** *University of California, Davis, USA*			
	12:00 – 1:30PM	Lunch			
		Antica I	**Antica II**	**Antica III**	**Antica V**
	1:30 – 3:10PM	**SMART2004 #1**	**MIDAS # 1**	**Adv Moulding &Forming #1**	**Biomaterials #1**
	3:10 – 3:30PM	Tea Break			
	3:30 – 5:10PM	**SMART2004 #2**	**MIDAS # 2**	**Adv Moulding &Forming #2**	**Biomaterials #2**

Day 2: 25 November 2004, Thursday

	Time	Programme			
		Antica I	**Antica II**	**Antica III**	**Antica V**
	8.30 – 10.30AM	**SMART2004 #3**	**MIDAS # 3**	**Adv Moulding &Forming #3**	**General # 1**
	10:30AM – 10:50AM	Tea Break			
	10.50 – 12.30PM	**SMART2004 #4**	**MIDAS # 4**	**Adv Moulding &Forming #4**	**General # 2**
	12:30PM – 1:50PM	Lunch			
		Antica I	**Antica II**	**Antica III**	**Antica V**
	1:50PM – 3:30PM	**SMART2004 #5**	**MIDAS # 5**	**General # 3**	**Biomaterials #3**
	3:30PM– 3:50PM	Tea Break			
	3:50PM – 5:30PM	**SMART2004 # 6**	**MIDAS # 6**	**General # 4**	**Biomaterials # 4**

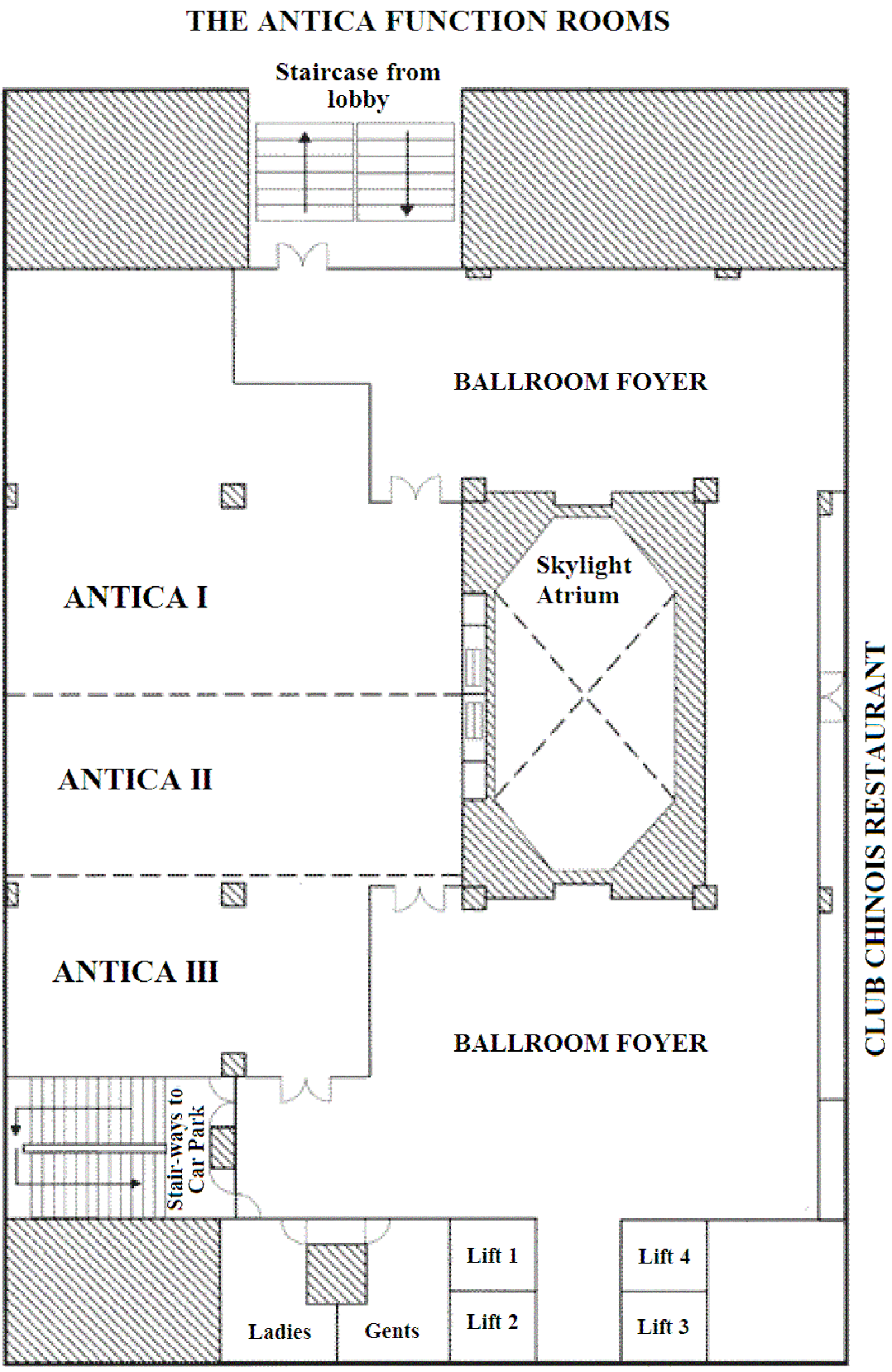
Day 3: 26 November 2004, Friday.

	Time	Programme				
	9:10 – 9:40AM	Welcome to NTU - NTU Lecture Theater 02				
		NTU LT 08	**NTU LT 05**	**NTU LT 12**	**NTU LT 06**	**NTU LT 14**
	9:50AM – 12:30PM	**SMART2004 #7**	**MIDAS #7**	**Adv Moulding &Forming #5**	**General #5**	**Biomaterials # 5**
	12:30PM – 1:50PM	Lunch				
	1.50PM– 3:30PM	**SMART2004 #8**		**Adv Moulding &Forming#6**	**General #6**	
	3:50PM – 5.00PM	**Poster Session**				
	5:00PM – 6.00PM	Tour of Nanyang Technological University and related facilities				
	6:30PM – 9.00PM	**Conference Banquet at Staff Club, NTU**				

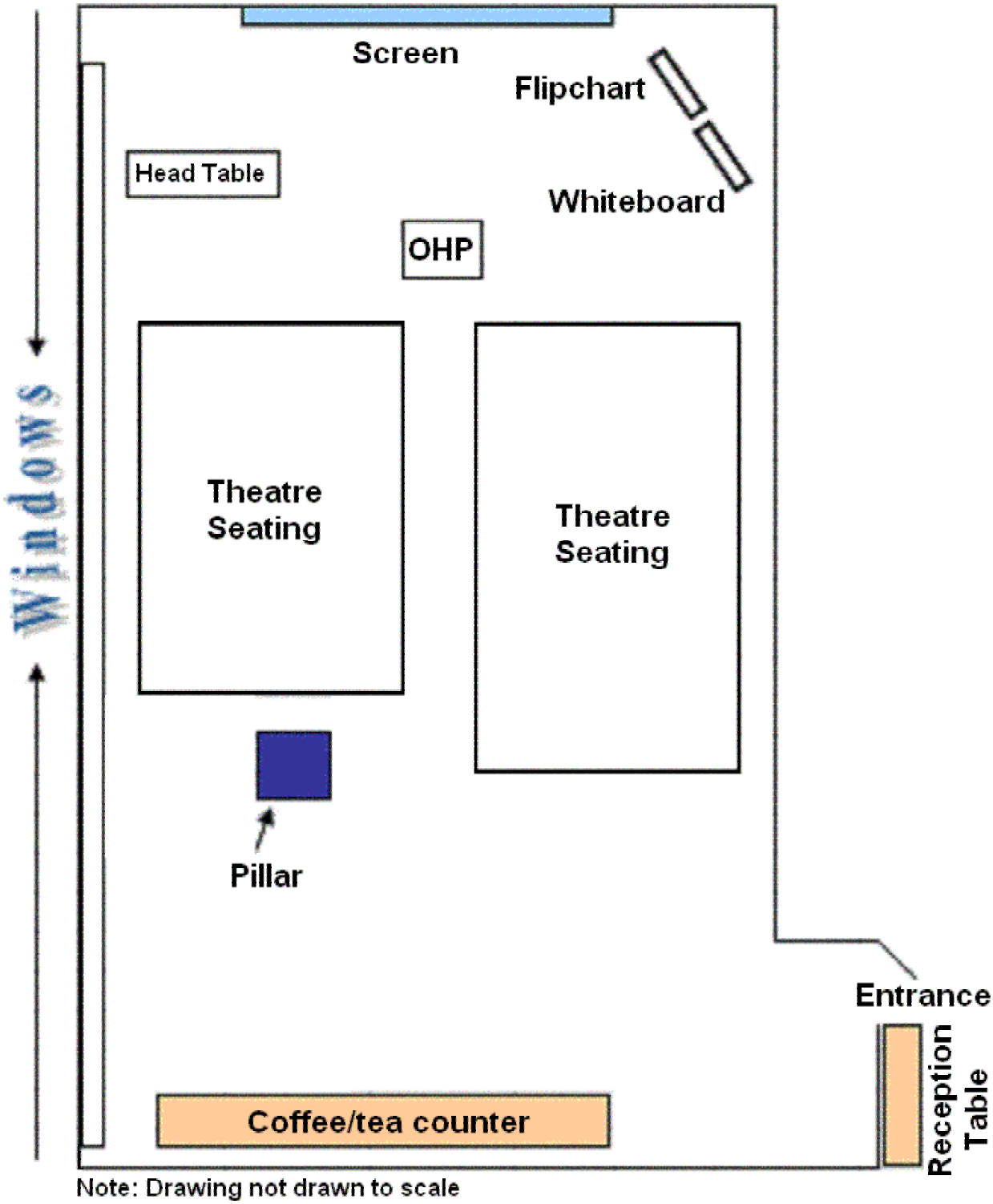
Antica Function Rooms Floor Plan

(Antica I, II and III: Level 2: Antica V: Level 6)

Antica I, II and III: Level 2

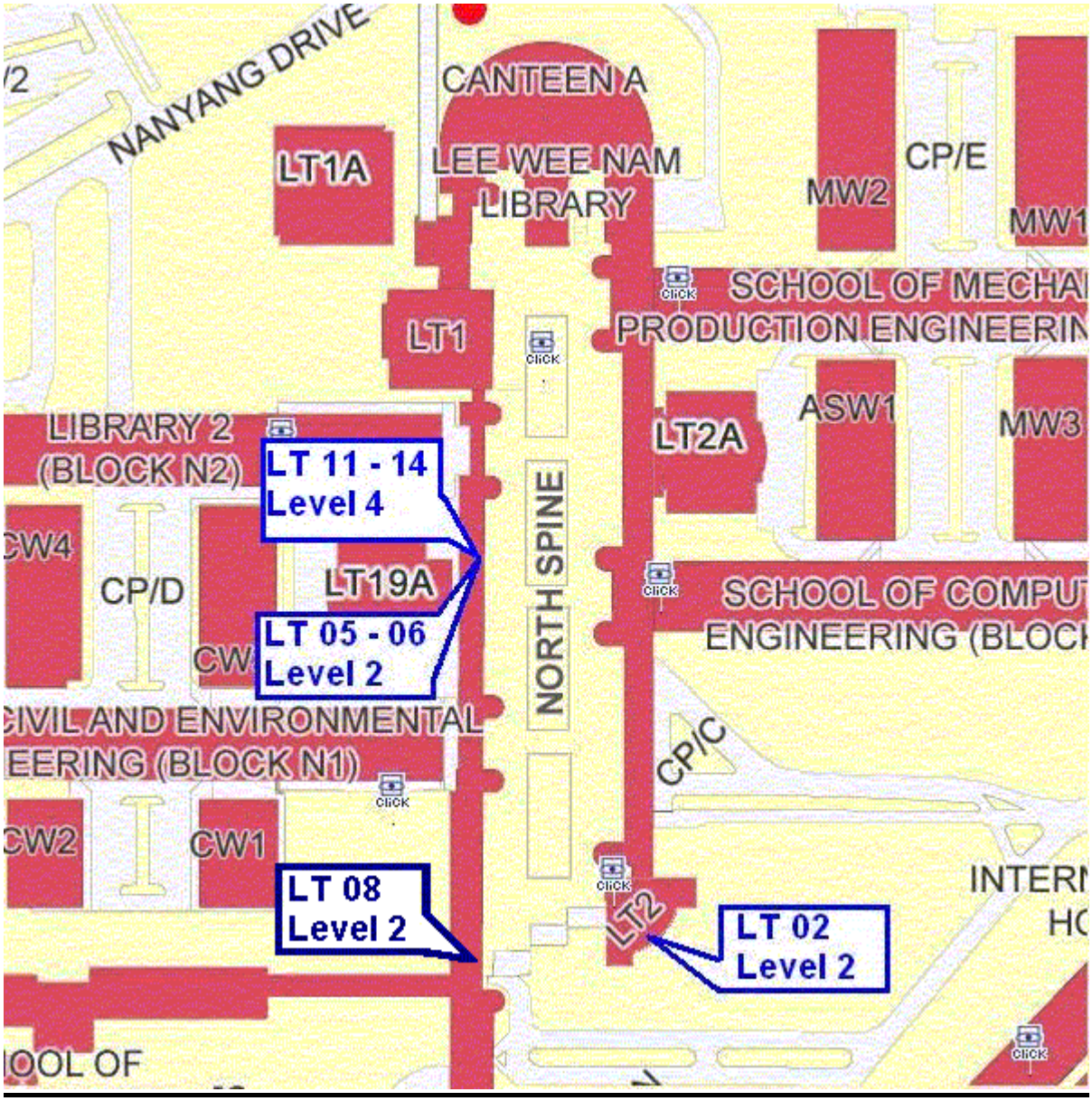


Antica V: Level 6

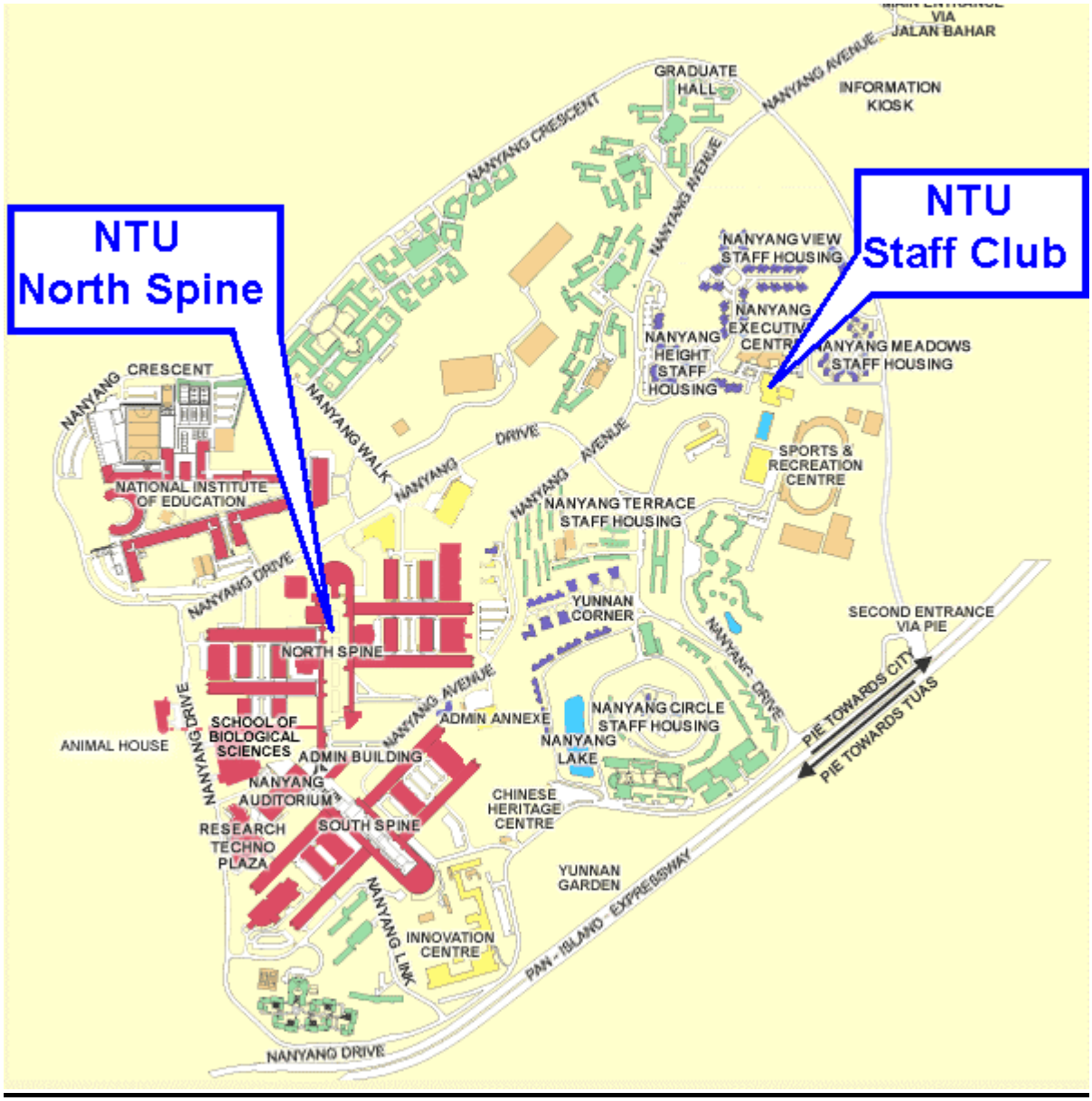


Note: Drawing not drawn to scale

NTU Lecture Theaters



NTU Staff Club



Advanced Moulding and Forming Technologies Symposium

(Chairman: Dr. Zhao Jianhong)

Wednesday, November 24, 2004

AMFT Session #1 (Ceramics) **1:30 PM – 3:10 PM**

Room: Antica III
Chairman: Zhao Jianhong

1:30 PM
AMFT0069, Piotter, Volker (Invited Speaker)
New Developments in Micro Injection Molding of Polymers, Metals, and Ceramics, *Institut fuer Materialforschung III, Germany,* Volker Piotter, Guido Finnah, Gissur Oerlygsson, Robert Ruprecht and Juergen Hausselt

2:00 PM
AMFT0055, Li, Q. F. (Oral)
Studies on Ti-Sn Alloys & Ti-Sn-TiB Metal Matrix Composites by Semi-Solid Metal Powder Forming, *Singapore Institute of Manufacturing Technology, Singapore,* Q.F.Li, Suxia Zhang, Ho Meng Kwong and S. F. Pook

2:20 PM
AMFT0058, Zhang, S. X. (Oral)
Manufacturing of M2 Tool Steel Core Insert With Thin Wall Feature By Powder Injection Moulding, *Singapore Institute of Manufacturing Technology, Singapore,* S.X. Zhang, Q.F. Li and M. K. Ho

2:40 PM
AMFT0070, Pramanik, P. (Oral)
Preparation of Nanosized Mixed-Oxide Powders using Organic Amines / Acids as Co-ordinating Agents, *Indian Institute of Technology, India,* A. Tarafdar, Soumyakanti Biswas and P. Pramanik

TEA BREAK: **3:10 PM – 3:30 PM**

AMFT Session #2 (Metals I) **3:30 PM – 5:00 PM**

Room: Antica III
Chairman: John Yong

3:30 PM
AMFT0052, Heath, Peter J (Invited Speaker)
Art or Science: Machines for Processing Diamond and Other Ultra-Hard Materials, *Peter Heath & Associates, Singapore,* P. Heath

4:00 PM
AMFT0077, Bonek, Miroslaw (Oral)
The Investigation of Microstructures and Properties of X40CrMoV5-1 Hot Work Tool Steel after Laser Alloying, *Silesian University of Technology, Poland,* L.A. Dobrzański, M. Bonek, E. Hajduczek and A. Klimpel

4:20 PM
AMFT0080, Goh, C. V. Francis (Oral)
Effects of using Mechanically Alloyed reAgent on Self-Propagating High-Temperature Synthesis of NiTi, *Singapore Institute of Manufacturing Technology, Singapore,* Francis C.W. Goh, Y.W. Gu, C.S. Lim, A.E.W. Jarfors, B.Y. Tay and M.S. Yong

4:40 PM
AMFT0057, Tong, K. K. (Oral)
Performances of New Lubricants in Cold Forging, *Singapore Institute of Manufacturing Technology, Singapore,* K.K. Tong, T. Muramatsu, S.X.Zhang, H.P. Liu and M.S.Yong

Thursday, November 25, 2004

AMFT Session #3 (Polymers I) 8.30 AM – 10.30 AM

Room: Antica III
Chairman: Rong Zheng & Liu, Shih-Jung

8:30 AM
AMFT0075, Kao, N. (Invited Speaker)
The Effect of Temperature on the Rheology of PS/SEBS Blends, *RMIT University, Australia,* S. Raha, N. Kao and S. N. Bhattacharya

9:00 AM
AMFT0073, Groleau, Rodney J (Oral)
Injection Molding: Automated Abnormal Part Containment, *RJG Inc., USA,* RODNEY J. GROLEAU and KENNETH L. FASSETT

9:20 AM
AMFT0085, Huang, Han-Xiong (Oral)
Online Measurement and Analysis of Parison Dimensions in Plastics Extrusion Blow Molding, *South China University of Technology, China,* Jiong-Cheng Li, Han-Xiong Huang and You-Fa Huang

9:40 AM

AMFT0061, Yan, Yehai (Oral)

Formation of Anti-adhesive Silicone Films and Their Interaction with UV Embossing Resin, *Nanyang Technological University, Singapore,* Y. H. YAN, C. W. CHUNG, M. B. CHAN-PARK, and C. Y. YUE

10:00 AM

AMFT0059, Zhao, J (Oral)

Process Parameter Studies of Hot Embossing Process for Polymer Molded Interconnect Devices, *Singapore Institute of Manufacturing Technology, Singapore,* J Zhao, P. Glendenning, G. Chen, Y. K. Juay, and J. Yong

10:20 AM

AMFT0054, Liu, S. L. (Oral)

Fabrication and Properties of β-Polypropylene/Organoclay Nanocomposites, *Singapore Institute of Manufacturing Technology, Singapore,* S. L. Liu, S. H. Lim, J. H. Zhao, M. S. Yong and X. H. Lu

TEA BREAK: 10.40 AM – 10.50 AM

AMFT Session #4 (Processing) 10.50 AM – 12.40 PM

Room: Antica III

Chairman: Heath Peter J. & Steven Tong

10:50 AM

AMFT0066, Qu, Jinping (Invited Speaker)

New Processing Technology for Polymers: Electromagnetic Dynamic Injection Molding, *South China University of Technology, China,* Qu Jinping and Wu Hongwu

11:20 AM

AMFT0089, Wan, Yee Ming Stephen (Oral)

Nd –YAG Laser Carving of Flow-field Channels in Polymer Graphite Composite Bi-polar Plates, *Singapore Institute of Manufacturing Technology, Singapore,* Stephen Wan Yee Ming, Erna Gondo Santoso, Teh Kim Ming, Lim Gnian Cher and Daniel Lim Jye Suenn

11:40 AM

AMFT0051, WILHELMI, O. (Oral)

Hot Embossing of micro- and nanoscale devices, *National University of Singapore (SSLS), Singapore,* O. Wilhelmi, Shahrain bin Mahmood, Kong J.R., Saw B.T., B.D.F. Casse, S.P. Heussler, H.O. Moser, Chen A., Wang B. and Chua S.J.

12:00 PM

AMFT0091, Ma, Sha (Oral)

A Study on Mechanical Properties of Selective Laser Melting, *Singapore Institute of Manufacturing Technology, Singapore,* Sha Ma, Kozo Osakada and Fumie Abe

12:20 PM
AMFT0071, Madhavi, Dave (Oral)
Electrical Properties of MoS_2 And $MoSe_2$ Single Crystals Grown by Iodine Transport Method, *Sardar Patel University, INDIA,* Madhavi Dave, S. G. Patel and A. R. Jani

LUNCH: 12:40 – 1:50 PM

Friday, November 26, 2004

AMFT Session #5 (Polymers II) 9.50 AM – 12.40 PM

Room: NTU LT 12
Chairman: Kao. N. & Li Qingfa

9:50 AM
AMFT0076, Rong, Zheng (Invited Speaker)
Flow-induced Orientation in Shear Flow and Injection Molding of Semi-crystalline Polymer, *Moldflow Pty Ltd, Australia,* Rong Zheng and Peter K. Kennedy

10:20 AM
AMFT0068, Liu, Shih-Jung (Invited Speaker)
Research and Development of Water Assisted Injection Molding Technology, *Chang Gung University, Taiwan,* Shih-Jung Liu

10:50 AM
AMFT0081, Kandasubramanian, Bala (Oral)
Effect of Blowing Agent on the Foam Structure of Polyvinyl Alcohol, *Pera Innovation Park, UK,* Bala Kandasubramanian, Paul Anderson and Nee Joo Teh

11:10 AM
AMFT0090, Zhao, J (Oral)
Micro Cavity Filling Behavior Studies of Polymer Materials in Micro Molding Process, *Singapore Institute of Manufacturing Technology, Singapore,* J. Zhao, A. Pauling, S. L. Liu, G. Chen, and M. W. Lee

11:30 AM
AMFT0067, Wu, Hongwu (Oral)
Processing Optimization and Physical Properties in Dynamic Injection-molded Isotactic Polypropylene, *South China University of Technology, China,* Wu Hongwu, Zhong Lei and Qu Jinping

11:50 AM
AMFT0056, Chen, G. (Oral)
CAE Virtual Prototyping for Injection Moulding of a Long Plastic Flat Plate Component, *Singapore Institute of Manufacturing Technology, Singapore,* G. Chen, J. Zhao and Raymond Ong

12:10 PM
AMFT0087, Huang, Han-Xiong (Oral)
Neural Network Applied To Predict the Parison Dimensions in Plastics Extrusion Blow Molding, *South China University of Technology, China,* Dong Li, Han-Xiong Huang and Yan-Juan Yang

Lunch: 12.30 PM – 1.50 PM

AMFT Session #6 (Metals II) **1.50 PM – 3.30 PM**

Room: NTU LT 12
Chairmen: Piotter, Volker & Tong KK

1:50 PM
AMFT0060, Fu, M. W. (Oral)
Concurrent Design of Metal Forming Part and Tooling via Integrated CAE Simulation, *Singapore Institute of Manufacturing Technology, Singapore,* M. W. Fu, K. K Tong, M. S Yong, T. Muramatsu and A. Danno

2:10 PM
AMFT0062, Mohan, Kapil (Oral)
Failure of a Sandwich Beam Consisting of Alumina Facesheet and a Aluminum Foam Core, *Nanyang Technological University, Singapore,* Kapil Mohan, Yip Tick Hon and Idapalapati Sridhar

2:30 PM
AMFT0078, Drak, Matgorzata (Oral)
Structure and Properties of Polymer Matrix Hard Magnetic Composite Materials Nd-Fe-B, *Silesian University of Technology, Poland,* L.A. Dobrzanski and M. Drak

2:50 PM
AMFT0092, Ansari, Mohamed (Oral)
ABS/MMT Nanocomposite for Fused Deposition Modeling (FDM), *AIMST, Malaysia*, Mohamed Ansari

Biomaterials Symposium for the 21st Century

(Chairperson: A/P C. P. Ooi)

Wednesday, November 24, 2004

Biomaterials Session # 1: 1.30 pm – 3.10 pm

Room: Antica V
Chairman: Dr. A. Soutar (SIMTech, Singapore)

1:30 PM
MP3-BM25, X. Su (Invited)
OLIGONUCLEOTIDE ASSEMBLY FOR DNA HYBRIDISATION AND PROTEIN-DNA BINDING, *Institute of Materials Research Engineering*, Xiaodi Su, Ying-Ju Wu, Wolfgang Knoll

1:50 PM
MP3-BM21, L. P. Tan (Oral)
EVALUATION OF BIOPOLYMER BLEND AS VASCULAR STENT MATERIAL, *Nanyang Technological University, SINGAPORE*, L. P. Tan, S. Venkatraman

2:10 PM
MP3-BM07 T. Boontheekul (Oral)
PEPTIDE-MODIFIED HYDROGELS FOR TISSUE ENGINEERING, *Department of Chemical Engineering, University of Michigan, USA*, T. Boontheekul, J. L. Drury, D. J. Mooney

2:30 PM
MP3-BM17, Hui Tong Tan (Oral)
SYNTHESIS AND CHARACTERISATION OF PLA BY MELT POLYCONDENSATION USING BINARY CATALYST SYSTEM, *Nanyang Technological University, SINGAPORE*, H. T. Tan, C. P. Ooi, M. Chandrasekaran

2:50 PM
MP3-BM05, F. Alexis (Oral)
CHAIN SCISSION MECHANISMS IN BIOERODIBLE POLYESTERS, *Institute of Bioengineering and Nanotechnology*, SINGAPORE, Frank Alexis, Santosh Kumar Rath, and Subbu Venkatraman

TEA-BREAK: 3.10 – 3.30 pm

Biomaterials Session #2 3.30 AM – 5.10 PM

Room: Antica V
Chairman: A/P C. P. Ooi (NTU, Singapore)

3:30 PM
MP3-BM08, H. Tsutsumi (Invited)
PREPARATION OF POLY(VINYL ALCOHOL)-BASED POLYMER-HYDROXYAPATITE COMPOSITES AND ITS APPLICATION TO SCAFFOLD MATERIALS, *Applied Medical Engineering Science, Graduate School of Medicine, Yamaguchi University, JAPAN*, H. Tsutsumi, Y. Shibasaki, K. Onimura, and T. Oishi

3:50 PM
MP3-BM12, P. W. Hoo, (Oral)
TITANIA-HYDROXYAPATITE BIOCERAMICS, *Nanyang Technological University, SINGAPORE*, P.W. Hoo, W. Dong, X. Miao

4:10 PM
MP3-BM23, S. Yu, (Oral)
POROUS SHA/PEEK SCAFFOLDS FOR BIOMEDICAL APPLICATION, *Nanyang Technological University, SINGAPORE*, S. C. Yu, P. Cheang, K. A. Khor

4:30 PM
MP3-BM15, Y. Chen (Oral)
EFFECT OF ZIRCONIA ADDITION ON THE THERMAL PROPERTIES OF FHA-YTZP COMPOSITES.
Nanyang Technological University, SINGAPORE, Y. Chen, X. Miao

4:50 PM
MP3-BM28, T.S.Sampath Kumar (Oral)
INFLUENCE OF MICROWAVE POWER ON NANOSIZED HYDROXYAPATITE PARTICLES,
Department of Metallurgical & Materials Engineering, Indian Institute of Technology Madras, INDIA,
A.Siddharthan, D. Siva Rama Krishna^{+}, S.K.Seshadri and T.S.Sampath Kumar

Thursday, November 25, 2004

Biomaterials Session #3 1.50 pm – 3.30 pm

Room: Antica V
Chairman: A/P X. Miao (NTU, Singapore)

1:50 PM
MP3-BM01, Zhuwei Du (Invited)
BIOMIMETIC NUCLEATION AND GROWTH OF $CaCO_3$ CRYSTALS ON PSS/PDAC SELF-ASSEMBLED MULTILAYERS, *National Key Laboratory of Biochemical Engineering, Institute of Process Engineering, Chinese Academy of Sciences, P. R. CHINA,* Zhuwei Du, Juanling Hao, Haoran Li

2:10 PM
MP3-BM24 F.E. Wiria (Oral)
THEORETICAL TREATMENT AND EXPERIMENTAL VERIFICATION OF SELECTIVE LASER SINTERED BIOPOLYMER POWDERS, *Nanyang Technological University, Singapore Institute of Manufacturing Technology*; *SINGAPORE,* F. E. Wiria, C. K. Chua, M. Chandrasekaran and K. F. Leong

2:30 PM
MP3-BM27, T. Kurniawati (Oral)
3-D PRINTING OF TRICALCIUM PHOSPHATE SCAFFOLDS, *Division of Bioengineering, Nanyang Technological University, SINGAPORE*, T. Kurniawati, P. Cheang, and M. Chandrasekaran

2:50 PM
MP3-BM26 Wai-Yee Yeong (Oral)
3-D INKJET PRINTER FOR RAPID PROTOTYPING: EVALUATION AND A PHYSICAL MODEL, *School of Mechanical and Production Engineering, Nanyang Technological University; Forming Technology Group, Singapore Institute of Manufacturing Technology, SINGAPORE*, Wai-Yee Yeong, Chee-Kai Chua, Kah-Fai Leong and Margam Chandrasekaran

3:10 AM
MP3-BM16, V. K. Popov (Oral)
LASER RAPID PROTOTYPING TECHNIQUES FOR FABRICATION OF CUSTOM-DESIGNED IMPLANTS AND SCAFFOLDS FOR TISSUE ENGINEERING, *Institute on Laser and Information Technologies, Russian Academy of Sciences, RUSS*IA, V.K. Popov, E.N. Antonov, V.N. Bagratashvilli, A.V. Evseev and A.N. Konovalov, J. J.A. Barry, M.J.Whitaker, S.M. Howdle

TEA-BREAK: 3.30 – 3.50 pm

Biomaterials Session #4 3.50 pm – 5.30 pm

Room: Antica V
Chairman: A/P L. P. Tan (NTU, Singapore)

3:50 PM
MP3-BM14, X. Miao (Oral)
PREPARATION AND CHARACTERISATION OF CALCIUM PHOSPHATE BONE CEMENTS, *Nanyang Technological University,* SINGAPORE, X. MIAO, G. LIM, K. H. Loh, A. R. Boccaccini

4:10 PM
MP3-BM22, S. K. Ho, (Oral)
EFFECT OF POLYMER STRUCTURE ON THE GANCICLOVIR RELEASE RATE OF BIODEGRADABLE POLYMERIC OCULAR IMPLANT, *Nanyang Technological University, SINGAPORE*, S. K. Ho, C. P. Ooi

4:30 PM
MP3-BM09, Dusan Bakos (Oral)
OPTIMIZATION OF SCAFFOLD BASED ON BIOPOLYMER COMPLEXES, *Faculty of Chemical and Food Technology, Slovak University of Technology, SLOVAK REPUBLIC*, Dusan Bakos, Lenka Kukolikova, Silvia Hanzelova, Pavol Alexy

4:50 PM
MP3-BM06, Oksan Karal Yilmaz (Oral)
CHARACTERISATION AND DEVELOPMENT OF COLLAGEN MODIFIED BIOPOLYMERS AND THEIR CELL GROWTH STUDIES, *TUBITAK, Research Inst. for Genetic Engineering and Biotechnology, TURKEY*, Oksan Karal Yilmaz, Aleksandra Porjazoska, Kemal Baysal, Maja Cvetkovska, Serap Şirvancı, Feriha Ercan, Bahattin M.Baysal

5:10PM
MP3-BM03, Y. A. Shchipunov (Oral)
BIOCATALYSTS PREPARED BY THE IMMOBILISATION OF ENZYMES IN THE SOL-GEL DERIVED HYBRID POLYSACCHARIDE-SILICA NANOMATERIALS, *Institute of Chemistry, Far East Department, Russian Academy of Sciences, RUSSIA*, Y. A. Shchipunov, T. Yu. Karpenko, I. Y. Bakunina, M. I. Kusaikin and T. N. Zvyagintseva,

Friday, November 26, 2004

Biomaterials Session #5 9.50 pm – 11.10 pm

Room: NTU LT 14
Chairman: A/P D. Butler (NTU, Singapore)

9:50 AM
MP3-BM13, P. W. Hoo, (Oral)
EFFECT OF CALCINATION AND ZIRCONIA ADDITION ON THE STABILITY OF ANATASE TITANIA PHASE, *Nanyang Technological University, SINGAPORE*, P. W. Hoo, X. Miao

10:10 AM
MP3-BM29, Sheng Fu (Oral)
RED BLOOD CELL SURFACE SCAN VIA ATOMIC FORCE MICROSCOPE, *Nanyang Technological University, SINGAPORE*, Sheng Fu, Leong Chuan Kwek, Shankar Muthu Krishnan, Teck Chee Chia, Cheong Hoong Diong and Tang Choong Leong

10:30 AM
MP3-BM30, J. L. Xu (Oral)
SPARK PLASMA SINTERING AND IN VITRO STUDY OF RF PLASMA PROCESSED HA POWDERS, *Nanyang Technological University, SINGAPORE*, J. L. Xu, K. A. Khor, Y. W. Gu, W. M. Soon, P. Cheang

10:50 AM
MP3-BM31, L.S. Goi (Oral)
SINTERING OF POROUS Ti6Al4V IMPLANT WITH ELEMENTAL AND MECHANICALLY ALLOYED(MA) POWDERS, *SIMTech, SINGAPORE*, L.S. Goi, Y.W. Gu, M.S. Yong, D. L. Butler, A. Jarfors

11:10 AM
MP3-BM32, H. Li (Oral)
SPARK PLASMA SINTERING OF NANO-STRUCTURED HA, *Nanyang Technological University, SINGAPORE*, Hua Li, Ligen Yu, P. Cheang, K. A. Khor

11:30 AM
MP3-BM33, Xi Chen (Oral)
EFFECT OF GANCICLOVIR CONTENT ON THE RELEASE RATE OF PLGA MICROSPHERES, *Nanyang Technological University, SINGAPORE*, X. Chen, C. P. Ooi

General MP^3 Symposium

(Chairman: A/P K. A. Khor)

Thursday, November 25, 2004

General Session # 1: 8.30 AM – 10.30 AM

Room: Antica V
Chairman: Dr. K. Hanada (AIST, Japan) and Dr. L. G. Yu (NTU, Singapore)

8:30 AM
MP3-38, Dr., Mishnaevsky Jr., Leon L., (Invited)
Computational Design of Bioinspired Composite Materials: an Approach Based on the Numerical Experiments, *University of Stuttgart, IMWF, Germany*, Leon Mishnaevsky Jr,

8:50 AM
MP3-20, Hanada, K., (Invited)
Recycle of Grinding Metal Sludge by Plasma Spray, *National Institute of Advanced Industrial Science and Technology, Japan*, K. Hanada, K. Matsuzaki, K. Hatsukano and T. Shimizu,

9:10 AM
MP3-45, Yamashita, Ryo (Oral)
Direct Fabrication of TiO_2 Films in Aqueous Solutions, *Tokyo Institute of Technology, JAPAN,* Takeshi Fujiwara, Ryo Yamashita and Masahiro Yoshimura,

9:30 AM
MP3-9, Dr, Sharma, S. C., (Oral)
Effect of Mica on the Properties of ZA-27 Alloy Composites, *R V College of Engineering, INDIA*, Shivarudraiah, S.C. Sharma, M. Krishna,

9:50 AM
MP3-2, Takahashi, Masaharu, (Oral)
Micro/Nano Hot Embossing of Glass Materials with Glassy Carbon Mold fabricated by FIB Etching, *National Institute of Advanced Industrial and Science Technology (AIST), JAPAN*, Masaharu Takahashi, Yoichi Murakoshi, Yasuhisa Ando, Kohichi Sugimoto, Ryutaro Maeda,

10:10 AM
MP3-27, Umesh, C.K., (Oral)
High Speed Machining of Aluminium – Silicon Alloys-Influence of Cutting Parameters on Machinability, *U.V.C.E., India,* C. K. Umesh, D. Sarathy, B. K. Muralidhara & V. K. Basalalli,

TEA-BREAK: 10.30 – 10.50 AM

General Session #2 10.50 AM – 12.30 PM

Room: Antica V

Chairman: Prof. Dr. J. Matsushita (Tokai Univ., Japan) and Dr. H. Li (NTU, Singapore)

10:50 AM

MP3-37, Dr, Stephani, Guenter (Invited)

New light weight materials based on metallic hollow spheres - processing, properties and applications, *Fraunhofer-Institute for Manufacturing and Advanced Materials - IFAM, Germany*, Günter Stephani, Ulf Waag, Hartmut Göhler, Matthias Reinfried

11:10 AM

MP3-21, Matsushita, J., (Invited)

Oxidation resistance of calcium boride covered C/C composite, *Tokai University, JAPAN*, J. Matsushita

11:30 AM

MP3-44, Nishimura, Eiichiro (Oral)

Melt Synthesis of Complex Double Oxides for Phosphors, *Tokyo Institute of Technology, JAPAN,* Tomoaki Watanabe, Eiichiro Nishimura, Kazumasa Seki, Shunji Araki, Tadashi Ishigaki and Masahiro Yoshimura,

11:50 AM

MP3-30, Yogesha, B., (Oral)

Some Studies on the Superplastic Deformation Behaviour of a Ti-Al-Mn Alloy, *Indian Institute of Technology Madras, INDIA*, B.Yogesha and S. S. Bhattacharya,

12:10 PM

MP3-5, Wongprasert, Yothin, (Oral)

S**tudied on Characteristics of MIS Diode from Diamond Like Carbon**, *King Mongkut's Institute of Technology, THAILAND*, Yothin Wongprasert, Wisut Titiroongruang,

LUNCH: 12:30 -1:50 PM

Thursday, November 25, 2004

General Session # 3 1.50 PM – 3.30 PM

Room: Antica III

Chairman: Dr. T. Shimizu (AIST, Japan) and Dr. P. Angerer (ARC Seibersdorf, Austria*)*

1:50 PM

MP3-50, Prof. Manshi Ohyanagi, (Invited)

Consolidation of Nanostructured β-SiC by Spark Plasma Sintering. *Ryukoku University, Japan.* Manshi. Ohyanagi

2:10 PM

MP3-11, Shimizu, Toru, (Oral)

Rapid Prototype of Titanium Parts using FDM Process, *National Institute of Advanced Industrial Science and Technology, Japan, JAPAN*, T. Shimizu, K.Okada and S. Fuchizawa,

2:30 PM

MP3-10, Dr/Asst Prof, Shivanand, H. K., (Oral)

Comparative Studies on Mechanical Properties of Aluminium Based Hybrid Composites Cast by Liquid Melt Technique and P/M Route, *Visvesvaraiah Technological University, India*, HK Shivanand, Mahagundappa M. Benal, N. Govindaraju, SC Sharma,

2:50 PM

MP3-32, Dr, Angerer, Paul, (Oral)

Spark-Plasma-Sintering (SPS) of nanostructured Tungsten Carbide powders, *ARC Seibersdorf research, Austria*, P. Angerer, L. G. Yu, K. A. Khor, G. Korb, and I. Zalite,

3:10 PM

MP3-4, Rerkratn, Apinai, (Oral)

Electrical Impedance Tomography System for Silicon Wafer Characterization, *King Mongkut's Institute of Technology Ladkrabang, THAILAND*, Apinai Rerkratn and Yothin Wongprasert,

TEA-BREAK: 3.30 – 3.50 PM

General Session #4 3.50 PM – 5.30 PM

Room: Antica III

Chairman: Prof. M. Yoshimura (Tokyo Inst. of Tech.) and Dr. L. G. YU (NTU, Singapore)

3:50 PM

MP3-42, Seki, Kazumasa (Oral)

Melt Synthesis of Complex Perovskite Oxides for Phosphers, *Tokyo Institute of Technology, JAPAN*, Masahiro Yoshimura, Kazumasa Seki, Eiichiro Nishimura, Tomoaki Watanabe, Shunji Araki, and Tadashi Ishigaki,

4:10 PM

MP3-8, Shivarudraiah, (Oral)

Stress Analysis of a Fan/Compressor Rotar Blade under the Influence of Tip-Rub, *Gas Turbine Research Establishment, INDIA*, H.N.Vidyasagar, Shivarudraiah, S.KrishnaMurthy, K.Ramachandra,

4:30 PM
MP3-23, Razak, Khairun A., (Oral)
BST Ferroelectric Material Produced by Hydrothermal Method, *The University of Auckland, NEW ZEALAND,* K. A. Razak and W. Gao ,

4:50 PM
MP3-34, M.K.Ambareesh and M.R. Praveen Kumar, (Oral)
Analysis on Machining Charachteristics of Spheroidized EN 2A Material by Plain Turning, *Sri Venkateswara College of Engineering, India*, N.Muthu Krishnan, K.Prahalad Rao, M.K.Ambareesh and M.R. Praveen Kumar

5:10 PM
MP3-36, Dr, Kwon, Y.-D. and H. W., (Oral)
Stress Analysis of High Pressure Slide Gate Bonnet for Curved Beam of Dam, *Kyungpook National University, Korea*, Y.-D. Kwon, J.-H. Lee, J.-H. Hwangbo, H.-C. Kwon and Y.-C. Jung,

Friday, November 26, 2004

General Session 5 9.50 AM – 12.30 PM

Room: NTU LT 06
Chairman: Dr. T. Studnitzky (Fraunhofer IFAM, Germany) and Dr. M. Espanol Pons (NTU, Singapore)

9:50 AM
MP3-33, Studnitzky, Thomas, (Oral)
Mechanical properties of hollow sphere structures for biomedical implants, *Fraunhofer Institute for Manufacturing and Advanced Materials, Germany*, T. Studnitzky, O. Andersen, G. Stephani,

10:10 AM
MP3-35, Girish, D. P., (Oral)
Influence of Boron and Carbon in Hardfacing Iron-Chrome Alloy System, *Kalpatharu Institute of Technology, India*, D.P.Girish, Dr. N.Govinda Raju, K.Srinivasan,

10:30 AM
MP3-6, Shivarudraiah, (Oral)
Microstructure and Mechanical Behavior of Functionally Graded Al-Si-Cu-Zn Alloy, *University Visvesvaraya College of Engineering, INDIA*, N.Chikkanna, P.Sankaran Kutty, Shivarudraiah,

10:50 AM
MP3-16, Dr/Asst Prof, Muthukrishnan, N., (Oral)
Influence of Cemented Carbide Tip Tool on Machining Ti6Al4V Alloy under Different Cutting Parameters, *Sri Venkateswara College of Engineering, INDIA*, N.Muthukrishnan, Sunil. P,

11:10 AM
MP3-41, Dr, Chang, Bong-Jun, (Oral)
Sulfonated Polystyrene/PTFE Composite Membranes for Direct Methanol Fuel Cell, *Korea Research Institute of Chemical Technology, Korea*, Bong-Jun Chang, Jeong-Pil Shin, Jeong-Hoon Kim, In-Jun Park, Soo-Bok Lee, Dong-Hak Seo,

11:30 AM
MP3-22, Prasad, Kamal, (Oral)
Glass Like Behaviour in $Pb[(Mg_{3/4}Cu_{1/4})_{1/3}Nb_{2/3}]O_3$ Ceramic, *T.M. Bhagalpur University, INDIA*, A. Kumar, K. Prasad, S.N. Choudhary and R.N.P. Choudhary,

11:50 AM
MP3-15, Dr, Mukunda, P. G., (Oral)
Studies on Wear Characteristics of Al-Si In-Situ Composites, *S. J. C. Institute of Technology, India*, K.G.Basava kumar, P.G. Mukunda, N. Govinda Raju, B.S. Murthy,

12:10 PM
MP3-7, Rajan, T.P.D., (Oral)
Processing and Characterisation of Functionally Graded Aluminum-Silicon Carbide Metal Matrix Composites, *Regional Research Laboratory (CSIR), INDIA*, T.P.D. Rajan, R.M. Pillai and B.C. Pai,

Lunch: 12.30 PM – 1.50 PM

General Session # 6 1.50 PM – 3.30 PM

Room: NTU, LT 06
Chairman: Dr. T. Studnitzky (Fraunhofer IFAM, Germany) and Dr. M. Espanol Pons (NTU, Singapore)

1:50 PM
MP3-12, Rajesh, S., (Oral)
Effect of Deposition Parameters on the Micro Structure of Spin Coated SnO_2 Films for Solar Cell Applications, *Karunya Institute of Technology, India*, S. Rajesh,

2:10 PM
MP3-18, Dr, Bakshi, Sarmistha, (Oral)
Functionally Graded Material in A Ni-Based Superalloy Single Crystal, *Indian Institute of Science, INDIA*, Sarmistha Bakshi, K. Chattopadhyay, S. Kumar,

2:30 PM
MP3-25, Rangson, Muanghlua, (Oral)
Gas Flow Sensor Based on Silicon Thermopile, *King Mongkut's Institute of Technology, THAILAND*, Rangson Muanghlua,

2:50 PM
MP3-14, Atiwongsangthong, Narin, (Oral)
Porous Silicon Visible Light Photodetector, *King Mongkut's Institute of Technology, THAILAND*, Narin Atiwongsangthong,

3:10 PM
MP3-39, Dr, Park, C.H., (Oral)
Optimal Mold Design in Rapid Mold Heating with Flame Jet Impingement, *Tech Center, LG Chem, Ltd.*, Korea, S.H. Park, Y.S. Park, C.H. Park, E.S. Lee and S.H. Lee,

3:30 PM
MP3-017, Prof. Sharma, K. V., (Oral)
Studies on Mechanical Properties of Aluminum Corundum Metal Matrix Composite, *Bangalore University, INDIA*, K V Sharma, Dr S Gopal Prakash, Dr C S M Murthy

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MP3-03, K. Lee, J.T. Seo*, S. Ma, P. Muhoro and B. Tabibi, W. Yu, M. NAMKUNG, S.S. Jung and R. Hyun, **Synthesis and optical properties of cadmium chalcogenide nanocrystals**, **POSTER**
Hampton University, Department of Physics, Hampton, VA 23668, USA

MP3-28, B. Chen*, X. Peng, J. Wang, X. Wu, **Observation on the microstructure of seashell and biomimetic research**, **POSTER,**
Chongqing University, College of Resource & Environmental Science, Chongqing, CHINA

MP3-29, B. Chen*, X. Peng, J. Wang, X. Wu, **Observation and analysis on the nanoscale structure of chafer cuticle and research of a biomimetic composite with branched fiber**, **POSTER,** Chongqing *University, College of Resource & Environmental Science, Chongqing, CHINA*

MP3-40, Leon S. Hoffmann* and M. Yoshimura, **Melt Synthesis of ceramic composites in the system Al_2O_3 – ZrO_2 – TiO_2**, **POSTER,**
Tokyo Institute of Technology, Materials and Structures Laboratory, 4259 Nagatsuta, Midori, Yokohama 226-8503, Japan

MIDAS-2004 Symposium

(Chairman: Assoc Prof Raju V. Ramanujan, SME, NTU)

Wednesday, November 24, 2004

MIDAS-2004 Session # 1: 1.30 pm – 3.10 pm

THEME: MAGNETIC MATERIALS

Room: Antica II
Chairman: Ashraf Uddin, NTU, Andersson, T., Sweden

1:30 PM
MDS16, Li, H.F. (Oral)
Mechanical alloying of Co-Si-B based amorphous magnetic alloys, *NTU, Singapore,* H.F. Li and R.V. Ramanujan

1:50 PM
MDS14, R.V. Ramanujan (Oral)
Nanostructured $Fe_{40}Ni_{38}B_{18}Mo_4$ Magnetic Alloys produced by Mechanical Alloying and Melt Spinning, *NTU, Singapore,* S.W. Du and R.V. Ramanujan

2:10 PM
MDS42, Oh, Joo Tien (Oral)
The Effect of Temperature Processing on the magnetic anisotropies of Ni-Fe-Cu-Cr soft Magnetic Alloy, *NTU, Singapore,* Zhou Wei, J. T. Oh and H. H. Hng

2:30 PM
MDS33, Anantharaman, (Oral)
Structural and Magnetic Properties of Thin Films Based on Finemet Alloys., , *India,* M.R. Anantharaman, S. Deepa, S. Swapna Nair, P.A. Joy and R.V Ramanujan

2:50 PM
MDS35, Khan, F.A. (Oral)
Magnetic phase transition of rf magnetron sputtered thin film of Fe/Cu granular nanoparticles., , *Bangaldesh,* F.A.Khan and Eiji Kita

TEA-BREAK: 3.10 – 3.30 pm

MIDAS-2004 Session #2 3.30 pm – 5.10 pm

THEME: MICROELECTRONIC MATERIALS

Room: Antica II
Chairman: C. C. Wong, NTU

3:30 PM
MDS34, Ang, Derrick (Oral)
The effect of linewidth scaling on hydrostatic stress in passivated interconnects, *NTU, Singapore,* D. ANG and R. V. Ramanujan

3:50 PM
MDS02, Park, H.S. (Oral)
Electromigration Voiding of Copper Dual Damascene Interconnects with Multiple Vias, *NTU, Singapore,* Hun Sub Park, Sock Meng Ong and Cher Ming Tan

4:10 PM
MDS11, Chew, Yeong Huey (Oral)
Interaction Effects between Calcium and Palladium Dopants on the Mechanical Properties of Fine Gold Bonding Wire, *NTU, Singapore,* Y.H. Chew, C.C. Wong, C. Breach, F. Wulff, S. G Mhaisalkar, S. L. Lim

4:30 PM
MDS07, Liu, Yang (Oral)
Study of Charging Effect in SiO_2 Films containing Si nanocrystals., *NTU, Singapore,* Y.LIU, T. P. CHEN, Y. Q. FU and J. H. HSIEH

4:50 PM
MDS06, Wong, Lydia (Oral)
Thermal relaxation of metastable strained SiGe epitaxial layers, *NTU, Singapore,* L.H. Wong, C.C. Wong, J.P. Liu, L. Chan

Thursday, November 25, 2004

MIDAS-2004 Session #3 8.30 AM – 10.40 PM

THEME: PHOTONIC MATERIALS - 1

Room: Antica II
Chairman: A/P H.S. Park, Prof. M.R. Anantharaman, India

8:30 AM

MDS41, Andersson, T. (Oral, INVITED)

Mobility limitations in AlGaN/GaN HFET heterostructures due to structural defects., *Chalmers University of Technology, Sweden,* T. G. Andersson, S. K. Davidsson, Y. Fu, and M. N. Gurusinghe

9:10 AM

MDS05, Zhang, J.X. (Oral)

Characterisation of polycrystalline GaN on Si substrate with magnetron-sputtered buffer layer, *NTU Singapore,,* J.X. Zhang, Y. Qu, S.G. Ma, and A. Uddin; Shu Yuan

9:40 AM

MDS18, Yi, Qu (Oral)

Highly Strained InGaAs Ridge Waveguide Lasers Fabricated with Pulsed Anodic Oxidation, *, Singapore,* Yi Qu, A. Uddin, C. Y. Liu, and J. X. Zhang; T. G. Andersson, and S. M. Wang

10:00 AM

MDS20, Nakata, H. (Oral)

Light scattering and transmission of synthesized opal., *Osaka-Kyoiku University, Japan,* H. Nakata, T. Shibata and T. Ohyama

TEA BREAK: 10.30 am – 10.50 am

MIDAS-2004 Session #4 10:50 am – 12.30 pm

THEME: PHOTONIC MATERIALS – 2 and CELLULAR SOLIDS

Room: Antica II

Chairman: W.T. Klooster, Australia

10:50 AM

MDS19, Ashraf, Uddin (Oral)

Study of carrier Injection from Al and NaCl/Al Cathodes into Alq_3, *NTU, Singapore,* A. Uddin, C. B. Lee, and A.C. Nguyen

11:20 AM

MDS45, Shen, P. K. (Oral)

Synthesis of Self-Supporting WO3 Multidimensional Networks., *,China ,* P. K. SHEN, X. L. WEI

11:50 PM

MDS31, Zhang, Q. Y. (Oral)

1.5-mm emission and infrared-to-visible upconversion luminescence of Er^{3+}/ Yb^{3+} in oxyhalide glasses for broadband fiber amplifiers and waveguide lasers, *, China,* Q. Y. Zhang , Z. M. Yang, Y. H. Liu , Z.D. Deng and Z. H. Jiang

LUNCH: 12:30 – 1:50 PM

MIDAS-2004 Session #5 1.50 pm – 3.30 pm

THEME: THIN FILMS

Room: Antica II
Chairman: A/P Chen Zhong, NTU, Prof. Rajendran, India

1:50 PM
MDS08, Ignat, Michel (Oral)
Mechanical durability of thin Titania films, deposited by ALD on Polycarbonate substrates., *, France,* M. Ignat, B. Latella

2:10 PM
MDS04, Chen, Zhong (Oral)
Thermal Stability of Ternary Ti-Si-N Hard Coatings, *NTU, Singapore,* Y. B. Yeo, X. Z. Ding and Z. Chen

2:30 PM
MDS43, Lau P.P. (Oral)
Statistical Study of Simultaneous Nucleation, Growth, and Ripening in Open System, *NTU, Singapore,* P. P. Lau, O. Prabhakar, C.C. Wong, L. Chan

2:50 PM
MDS36, Li, Yan (Oral)
Strength Enhancement And Structure Design Of Metallic Nanolaminates, *, China,* Dong Cheng [1], Li Yan [2], Zhijun Yan

3:10 PM
MDS32, Zhao, Yimin (Oral)
THERMAL CONDUCTIVITY AND MICROSTRUCTURE OF SPUTTERED AlN THIN FILMS, *, Singapore,* Y. ZHAO, G. CHEN, H. CHENG, P. HING

TEA BREAK: 3.30 pm – 3.50 pm

MIDAS-2004 Session #6 3.50 pm – 5.30 pm

THEME: FUNCTIONAL CERAMICS

Room: Antica II
Chairman: A/P Sun Yong, NTU, Dr. Ignat, France

3:50 PM

MDS37, Z. Du (Oral)

Recent development of multifunctional ceramics:TiO2, *Singapore,*

H.Huang L.M.Zhou, and Z.Du

4:10 PM

MDS17, Rajendran, V. (Oral)

Temperature Dependent Ultrasonic Velocity and Attenuation in $Sm_{0.67}Sr_{0.33}MnO_3$ Perovskite, *, India,* V. Rajendran, S. Muthu kumaran, T. Jayakumar, V. Sivasubramanian, Baldev Raj

4:30 PM

MDS40, Hu, Junhui (Oral)

A Low Frequency Piezoelectric Actuator for the Micro-Manipulation of Particles, *, Singapore,* J. Hu, A. K. Santoso, J. Xu and J. Yang

4:50 PM

MDS01, Li, S. (Oral)

Photonic Behavior of Nano-Particle ZnO, *NTU, Singapore,* Y.Y. Tay, P. Chen, J. Plevert, C.C. Wong, S.J. Chua and S. Li

5:10 PM

MDS12, Sawant, Vinay (Oral)

Comparisons of a new material PNN-PT-PZ with PZT arrays for Medical Ultrasound Transducers by Finite Element Analysis., *NTU, Singapore,* Vinay S. Sawant, M. K. Lim, S. M. Krishnan

Friday, November 26, 2004

MIDAS-2004 Session #7 9.50 am – 12.30 pm

THEME: CHARACTERIZATION, FUEL CELLS and POWDER TECHNOLOGY

Room: NTU LT 05

Chairman: A/P Alfred Tok, NTU, Dr. W.T. Klooster, Australia

9:50 AM

MDS13, KLOOSTER, W. T. (Oral)

FUTURE OPPORTUNITIES at the Replacement Research Reactor., *Bragg Institute, ANSTO, Australia,* W. T. Klooster

10:20 AM

MDS03, Liu, Qinglin (Oral)

Optimization of LSCF-GDC Composite Cathodes for Thin Film GDC Electrolyte Solid Oxide Fuel Cells, *NTU, Singapore,* Q.L. Liu, K.A. Khor and S.H. Chan

10:40 AM

MDS22, Liu, Z.C. (Oral)

EFFECT OF NAFION IMPREGNATION ON CATHODE BEHAVIORS IN PEMFC, *NTU, Singapore,* Z.C. Liu and S.P. Jiang

11:00 AM

MDS47, Leng, Yongjun (Oral)

(Gd,Ce) $(NO_3)_x$-modified-LSM cathodes for intermediate temperature solid oxide fuel cells, *NTU, Singapore,* Y. J. Leng, S. H. Chan, K. A. Khor and S. P. Jiang

11:20 AM

MDS23, Li Jianlin (Oral)

Electrohydydrodynamic spraying using a fiber combined nozzle, *NTU, Singapore,*

11:40 AM

MDS25, Luo, Linghong (Oral)

Synthesis, Characterization and Densification for 10GDC Powders via Sol-gel, Mixed Sol-salt and Coprecipitation: A Comparative Study, *NTU, Singapore,* Lu Linghong, Ng Su Hwee, Alfred Tok, F. Boey

LUNCH: 12.30 pm – 1.50 pm

Posters:

MDS44, Yamada, Y. (Poster)

Processing and Mechanical Properties of Hollow Sphere Aluminium Foams., *,Japan ,* Y. YAMADA, C.E. WEN, T. ASAHINA and M. MABUCHI

MDS38, GAYATHRI, V. (Poster)

Size dependent Mott like Transition in doped Carbon Nanotube, *, India,*

SMART2004 Symposium

(Chairman: Yong Liu)

Wednesday, November 24, 2004

SMART2004 Session # 1: 1.30 PM – 3.10 PM

Room: Antica I
Chairman: Rolf Gotthardt

1:30 PM
SMART-01, Prof. Van Humbeeck, Jan (Invited talk)
Active and passive damping of noise and vibrations through shape memory alloys: mechanisms and applications, *KULeuven, Belgium,* Jan Van Humbeeck and Sergey Kustov

2:00 PM
SMART-02, Prof. Miyazaki, S. (Invited talk)
Development of SMA thin films, applications and challenges remained, *University of Tsukuba, Japan,* S. Miyazaki

2:30 PM
SMART-03, Prof. Gotthardt, Rolf (Oral)
Ion irradiation of thin NiTi-SMA films, a technique to influence martensitic phase transformations and design new micro-actuators, *Swiss Federal Institute of Technology, Switzerland,* R. Gotthardt, T. Lagrange

2:50 PM
SMART-04, Prof. Ishida, A. (Oral)
Shape memory thin films formed with carrousel type magnetron sputtering apparatus, *National Institute for Materials Science, Japan,* A. Ishida, M. Sato, O. Tabata and W. Yoshikawa

TEA-BREAK: 3.10 – 3.30 PM

SMART2004 Session #2 3.30 PM – 5.00 PM

Room: Antica I

Chairman: Yong Liu

3:30 PM

SMART-05, Prof. Lindroos, V. K. (Invited talk)

Recent breakthrough development of the MSM effect in Ni-Mn-Ga alloys, *Helsinki University of Technology, Finland,* O. Söderberg, Y. Ge, A. Sozinov, S-P. Hannula and V. K. Lindroos

4:00 PM

SMART-06, Prof. Chernenko, V. A. (Oral)

Transformation behavior of the Ni-Mn-Ga thin films, *[1]Forschungszentrum Karlsruhe, Germany, [2]IMRAM, Tohoku University, Japan, [3]National Institute of Advanced Industrial Science and Technology, Tohoku Center, Japan, [4]Institute of Fluid Science, Tohoku University, Japan,* V.A. Chernenko, M. Ohtsuka, M. Kohl, V.V. Khovailo, T. Takagi

4:20 PM

SMART-07, Prof. Ohba, Takuya (Oral)

Fundamental structure of Ni_2MnGa intermediate phase having orthorhombic lattice, *[1]Department of Materials Science, Shimane University, Japan, [2]Materials Science and Engineering, Osaka University, Japan*, Takuya Ohba[1], Naohiro Miyamoto, Takashi Fukuda, Tomoyuki Kakeshita and Kenichi Kato

4:40PM

SMART-08, Prof. Hu, C. T. (Oral)

Magnetostrictive and shape memory properties of Fe-Pd alloys with Co and Pt additions, *[1]National Tsing-Hua University, Taiwan, ROC, [2]Institute of Material Science, University of Silesia, Poland,* D. Vokoun, Y.W. Wang, T. Goryczka, and C.T. Hu

Thursday, November 25, 2004

SMART2004 Session #3 8.30 AM – 10.40 PM

Room: Antica I

Chairman: Gunther Eggeler

8:30 AM

SMART-09, Prof. Sun, Qingping (Invited talk)

Macroscopic deformation instability in NiTi microtubing – experiment and modeling, *Hong Kong University of Science and Technology, P. R. China,* Qingping Sun

9:00 AM

SMART-10, Dr. Khalil-Allafi, Jafar (Oral)

Landau free energy model for the B2 ↔ R-Phase transition in a NiTi shape memory alloy, *Ruhr-University Bochum, Germany,* J. Khalil Allafi, W. W. Schmahl and T. Reinecke

9:20 AM
SMART-11, Prof. Liu, Yinong (Oral)
Mechanistic simulation of martensite reorientation deformation of polycrystalline NiTi, *[1]The University of Western Australia, Australia, [2]Laboratoire Sols-Solides-Structures, UMR CNRS 5521, UJF –INPG, BP 53, 38041 Grenoble Cedex, France,* Yinong Liu, D. Favier and L. Orgeas

9:40AM
SMART-12, Prof. Li, Yu-Long (Oral)
Superelastic behavior of NiTi SMA over a wide range of strain rates and temperatures, *[1]Northwestern Polytechnic University, China, [2]Department of Mechanical and Aerospace Engineering, University of California, San Diego, USA, Wei-Guo Guo*, Yu-Long Li, Hong-Xia Zhou and Sia Nemat-Nasser

10:00AM
SMART-13, Dr. Ren, J. (Oral)
Mesh-free modeling and simulation of thermomechanical behaviour of shape memory alloys, *Nanyang Technological University, Singapore,* J. Ren, K.M. Liew

10:20 AM
SMART-14, Mr. Wada, Kiyohide (Oral)
Shape recovery of a NiTi shape memory alloy under various pre-strain and constraint conditions, *Nanyang Technological University, Singapore,* Kiyohide Wada and Yong Liu

TEA BREAK: 10.40 AM – 11.00 AM

SMART2004 Session #4 11:00 AM – 12.20 PM

Room: Antica I
Chairman: VA Chernenko

11:00 AM
SMART-15, Prof. Lu, Li (Oral)
Ni-Mn-Ga ferromagnetic shape memory thin films prepared by pulsed laser ablation, *National University of Singapore, Singapore,* T. J. Zhu, L. Lu and M. O. Lai

11:20 AM
SMART-16, Dr. Ge, Yanling (Oral)
Investigation of magnetic domains in Ni-Mn-Ga alloys with SEM, *Helsinki University of Technology, Finland,* Y. Ge, O. Heczko, O. Söderberg, S-P. Hannula and V. K. Lindroos

11:40 AM
SMART-17, Dr. Guo, Shihai (Oral)
Effect of doped elements on martensitic transformation in NiMnGa magnetic shape memory alloy, *Central Iron and Steel Research Institute, China,* Shihai Guo, Yanghuan Zhang, Baiyun Quan, Jianliang Li, Yan Qi and Xinlin Wang

12:00 AM
SMART-18, Mr. Xiong, Feng (Oral)
Thermally induced fracture of NiMnGa single crystal, *[1]Nanyang Technological University, Singapore, [2]AdaptaMat Ltd., Yrityspiha 5, 00390 Helsinki, Finland*, Feng Xiong, Yong Liu and E. Pagounis

LUNCH: 12.20 – 1.50 PM

SMART2004 Session #5 1.50 PM – 3.30 PM

Room: Antica I
Chairman: Lu Li

1:50 PM
SMART-19, Dr. Haga, Y. (Oral)
Medical and welfare applications of SMA micro-coil actuators, *Tohoku University, Japan,* Y. Haga, M. Mizushima, T. Matsunaga and M. Esashi

2:10 PM
SMART-20, Dr. Teh, Y. H. (Oral)
A new control system for fast motion control of SMA actuator wires, *The Australian National University, Australia,* Y. H. Teh and R. Featherstone

2:30 PM
SMART-21, Prof. Lee, Yun-Jung (Oral)
Control of SMA actuators using derivative compensator of hysteresis, *Kyungpook National University, Korea,* Byung-Jun Choi, Yun-Jung Lee

2:50 PM
SMART-22, Mr. Elwaleed, A. K. (Oral)
A new concept of a linear smart actuator, *Universiti Kebangsaan Malaysia, Malaysia,* A. K. Elwaleed, N. Abdullah, M. J. Mohd Nor, M. M. Mohd

3:10 PM
SMART-23, Dr. Zhang, Jihua (Oral)
Two-way shape memory effect in γMn-Fe alloys, *Shanghai Jiao Tong University, China,* Peng Wenyi and Zhang Jihua

TEA BREAK: 3.30 PM – 3.50 PM

SMART2004 Session #6 3.50 PM – 5.30 PM

Room: Antica I
Chairman: Yinong Liu

3:50 PM
SMART-24, Prof. Eggeler, Gunther (Oral)
On the effect of aging on martensitic transformations in Ni-rich NiTi shape memory alloys, *Ruhr-Universität Bochum, Germany,* Gunther Eggeler, Jafar Khalil-Allafi, Susanne Gollerthan, Christoph Somsen, Wolfgang Schmahl, Denis Sheptyyakov

4:10 PM
SMART-25, Dr. Sawaguchi, T. (Oral)
The pseudo-elastic behavior of Fe-Mn-Si-based shape memory alloys containing Nb and C, *National Institute for Materials Science, Japan,* T. Sawaguchi, T. Kikuchi and S. Kajiwara

4:30 PM
SMART-26, Prof. Moumni, Z. (Oral)
Fatigue Analysis of Shape Memory Alloys, *UME/ENSTA 32 Boulevard Victor 75015 Paris, France, Z. Moumni, A. VanHerpen and P. Riberty*

4:50 PM
SMART-27, Dr. Sampath, V. (Oral)
Studies on effect of grain refinement and thermal processing on shape memory characteristics of Cu-Al-Ni alloys, *Indian Institute of Technology Madras, India,* V. Sampath

5:10 PM
SMART-28, Dr. Yuan B. (Oral)
Control of porosity and superelasticity of porous NiTi shape memory alloy prepared by hot isostatic pressing, *[1]South China University of Technology, [2]Dept. of Physics and Materials Science, City University of Hong Kong, China*, B. Yuan, C. Y. Chung, M. Zhu

Friday, November 26, 2004

SMART2004 Session #7 9.50 AM – 12.30 PM

Room: NTU LT 08
Chairman: Akira Ishida

9:50 AM
SMART-29, Prof. Nam, Tae-hyun (Oral)
Microstructures and shape memory characteristics of Ti-25Ni-25Cu (at%) alloy ribbons, *Gyeongsang National University, Korea,* Tae-hyun Nam, Soo-moon Park, Tae-yeon Kim and Yeon-wook Kim

10:10 AM
SMART-30, Ms. Cheng, Guiping (Oral)
The transformation characteristics of annealed $Ti_{50}Ni_{25}Cu_{25}$ melt spun ribbons, *Nanyang Technological University, Singapore,* G. P. Cheng and Z. L. Xie

10:30 AM

SMART-31, Prof. Liu Yinong (Oral)

Experimental investigations of machinability of $Ni_{50.6}Ti_{49.4}$ alloy, *[1]The University of Western Australia, Australia, [2]Singapore Institute of Manufacturing Technology, Singapore,* H. Huang, H.Y. Zheng and Y.N. Liu

10:50 AM

SMART-32, Dr. Mohanchandra, K. P. (Oral)

Deposition and characterization of Ti-Ni-Pd and Ti-Ni-Pt shape memory alloy thin films, *University of California, Los Angeles, USA,* K.P. Mohanchandra, Daniel Shin and G.P. Carman

11:10 AM

SMART-33, Dr. Shishkovsky, I. V. (Oral)

Mechanical properties and shape memory effect in NiTi, synthesized via SLS method, *P. N. Lebedev Physical Institute of Russian Academy of Science, Russia,* I.V. Shishkovsky

11:30 AM

SMART-34, Prof. Li, Chuan (Oral)

Two-way shape memory alloy springs produced by re-heat treatment method, *Nanyang Technological University, Singapore,* W. M. Huang, Chuan Li and E. K. Lee

11:50 AM

SMART-35, Mr. Abhilash, Vincent (Oral)

Composition analysis of NiTi thin films sputtered from mosaic target: synthesis and simulation, *Indian Institute of Science, India,* Abhilash Vincent, M.A. Sumesh and S. Mohan

Lunch: 12.10 PM – 1.50 PM

SMART2004 Session #8 Panel discussion 1.50 PM – 4.00 PM

Room: NTU LT 08

Tentative themes:

1. **Mechanism and driving force of shape recovery in SMAs.**
2. **Detwinning/reorientation in magnetic shape memory materials, influencing factors and significance.**

Keynote Talk #1 Wednesday, 24 November 2004, Antica I, II and III, 9:00 AM

Role of Materials Science in Microelectronics: Past, Present and Future

S. Mahajan
Department of Chemical and Materials Engineering
Arizona State University, Tempe, AZ 85284, USA

ABSTRACT

The evolution of microelectronics involved synergistic interactions to a large extent between three different disciplines: solid state physics, electrical engineering, and materials science. The conceptual framework for microelectronics was developed by solid state physicists. Electrical engineers designed integrated circuits that incorporated both passive components and active devices. Materials science provided a bridge between the activities of solid state physicists and electrical engineers that helped the realization of microelectronics.

In this talk, we will emphasize the role of materials science in the evolution of microelectronics in the past, what may be its current role, and what role it may have in the future. We will use specific examples, such as zone refining, growth of macroscopic dislocation-free silicon crystals, reduction of dislocations in III-V crystals, degradation behavior of light emitting devices, integration of dissimilar materials and growth of low-dimensional structures, to illustrate how principles of materials science have been utilized to address specific issues.

Over the years, the author has been supported by DOE, NSF, AFOSR, and ONR and is grateful for this support.

Keynote Talk #2 Wednesday, 24 November 2004, Antica I, II and III, 9:30 AM

Prof. Vijay K Varadan: **Applications of wireless microsensors and MEMS in engineering and medicine. Can we get smarter?** *Pennsylvania State University, USA.*

Keynote Talk #3 Wednesday, 24 November 2004, Antica I, II and III, 10:00 AM

Prof. Peter Marquis**: The potential of nanocomposites as biomaterials in medicine and dentistry.**
University of Birmingham, UK

Keynote Talk #4 Wednesday, 24 November 2004, Antica I, II and III, 10:50 AM

Direct Fabrication of Functional Ceramic Films and Patterns by Soft Solution Processing without Post Firing

M. Yoshimura, T. Watanabe, T. Fujiwara and R. Gallage
Materials and Structures Laboratory, Tokyo Institute of Technology
4259 Nagatsuta, Midori, Yokohama 226-8503, Japan
E-mail: yoshimura@msl.titech.ac.jp

ABSTRACT

We are proposing an innovative concept and technology, Soft Solution Processing (SSP) for Ceramics, which aims "direct fabrication of shaped, sized, located, oriented ceramic materials from solution(s) without firing and/or sintering." We have succeeded to fabricated thin/tick films of $BaTiO_3$, $SrTiO_3$, $BaWO_4$, $SrMoO_4$, $LiCoO_2$, $LiNiO_2$, etc., by SSP in aqueous solutions of RT-200^oC.

In those fabrications, interfacial reactions between a solid reactant (substrate) and component(s) in a solution have been designed and realized. When we have activated locally and moved the reaction point dynamically in those reactions, we can get patterned ceramics directly in solutions without any post-heating, masking/etching, firing nor sintering. Just recently we have succeeded to fabricate several patterned ceramics films i.e. $BaTiO_3$, $SrTiO_3$, PbS, CdS, $LiCoO_2$, carbon, etc. They are completely new processings for "direct patterning of ceramics," which seems to be the first success from/in solutions.

In previous reports, Patterning of Ceramics means pattern forming of powders or their precursors, thus heating for synthesis of sintering has been regarded to be essential. They should cost environmentally and economically. Our methods where no firing are needed to fabricate patterned ceramics should be "soft" (low cost) environmentally and economically.

Keynote Talk #5 Wednesday, 24 November 2004, Antica I, II and III, 11:20 AM

Effect of DC Pulsing on Reactivity in the Spark Plasma Sintering (SPS) Method

Zuhair A. Munir
Department of chemical Engineering and Materials Science
University of California
Davis, California 96516, USA

ABSTRACT

The nature and characteristics of pulsing in the SPS process were investigated, and the effect of pulsing pattern on the reactivity between Si and Mo was determined. The patterns were found to be made up of consecutive 3 ms peaks separated by a period of no current. The peaks (voltage) increased in magnitude with an increase of the "off" time relative to the "on" time in the patterns. The RMS value of the current was constant with changes in the pattern, indicating that this value is the governing condition to the power dissipation and thus temperature.

Pulsing effects on the reactivity between layers of Si and Mo were investigated. The direction of the current had no effect on the thickness of the product layer. More importantly, the growth rate of the product formed at 1070, 1170 and 1270°C was independent of the pulse pattern, in the range studied in this work.