

Preface

The International Conference of Solid State Science and Technology (ICSSST) is an annual event in Malaysia. In addition to this conference event, a workshop on Advanced Materials Technology: Growth and Characterization (AMTGC) have also been conducted. This 6th ICSSST and AMTGC workshop are jointly organized by the School of Physics and Institute of Nano-Optoelectronics Research and Technology (INOR), Universiti Sains Malaysia as host, in cooperation with the Malaysian Solid State Science and Technology Society (MASS). The aim of this conference was to provide a platform for discussions on solid-state science and technology in all aspects of physical and chemical properties, preparation and characterization techniques, optical properties; macro-, micro- and nanostructures. Furthermore, ICSSST 2017, which focuses on three key aspects of advanced technologies, namely nanoscience, nanotechnology and materials science, will provide the best platform for ideas and intellectual exchanges to catapult trans-disciplinary research, collaborations and networking among expert in the many areas of solid-state studies. The four days conference and workshop were well attended by over 200 participants, comprising mostly of scholars and researchers of solid-state research field from countries such as the USA, UK, Singapore, Japan, Kazakhstan, Iran, Nigeria, Indonesia and Malaysia.

The ICSSST 2017 has covered recent developments in the following main topics:

- ❖ Advanced Material Synthesis and Crystal Growth Technology
- ❖ Biomaterial
- ❖ Carbon and Related Materials
- ❖ Ceramics and Glasses
- ❖ Devices and Materials for Biology and Medicine
- ❖ Electrochemical & Solid State
- ❖ Lasers and Optoelectronics
- ❖ Magnetic Materials
- ❖ Materials and Energy
- ❖ Metals and Alloys
- ❖ Nanoscience and Nanotechnology



This volume of Journal of Solid State Phenomena: International Conference on Solid State Science and Technology includes 50 papers (oral presenters and posters) devoted to various branches of solid-state physics. We would like to thank the members of both the Organizing Committee and Reviewers for their patience and considerable effort to improve the manuscripts. Additionally, we deeply thank the authors for their high-level contributions and we are convinced that this volume will be of great interest to the international community of people working in solid-state physics.

Thank you.

The Editors,

Dr. Iskandar Shahrim Mustafa, (*Universiti Sains Malaysia, USM*)

Dr. Saiful Najmee Mohamad, (*Universiti Sains Malaysia, USM*)

Mr. Faris Hidayat Ahmad Suhaimi, (*Universiti Sains Malaysia, USM*)

Organizing Committee

Patron

Honourable Prof. Datuk Dr. Asma Ismail
Vice Chancellor
Universiti Sains Malaysia

Advisors

Prof. Dr Azlan Abdul Aziz
Prof. Dr Haslan Abu Hassan
Prof. Dr Abdul Halim Shaari

Mr. Tan Chun Ho

Workshop on nano-optoelectronics
Assoc. Prof. Dr Ng Sha Shiong
Mr. Mohd Anas Ahmad

Chairperson

Prof. Dr. Abdul Razak Ibrahim

Protocols and Management on Conference

Tentative, Program & Abstract Book

Dr. Mohd Mahadi Halim
Dr. Mohd Marzaini Bin Mohd Rashid
Dr. Ng Sha Shiong
Dr. Iskandar Shahrim Mustafa
Dr. Nur Shafawati Rosli
Dr. Nuridayanti Che Khalib Mrs. Junaidah
Abu bakar Mrs. Nordiyana Marzaki Mrs.
Norazlina Abd Malik Mrs. Dian Alwani
Zainuri
Ms. Siti Nur Shafiqah Abdul Rahim
Ms. Nurizati Rosli
Mr. Muhamad Akram Zaki Roslan

Deputy Chairman I

Prof. Dr. Mohd. Zubir Mat Jafri

Deputy Chairman II

Assoc. Prof. Dr. Ng Sha Shiong

Secretary I

Dr. Iskandar Shahrim Mustafa

Secretary II

Dr. Suhana Arshad

Treasurer I

Dr. Nik Noor Asyikin Nik Abd Razak

Treasurer II

Mrs. Siti Khadijah Mohd. Bakhor

Registration

Assoc. Prof. Dr. Yam Fong Kwong
Dr. Saiful Najmee Mohamad
Dr. Beh Khi Poay
Mr. Faris Hidayat Ahmad Suhaimi
Mr. Ng Yu Zhang

Exhibitions and sponsorship

Assoc. Prof. Dr. Wong Chow Jeng
Dr. Wan Maryam Binti Wan Ahmad Kamil
Ms. Nur 'Izazi Maad Tazri
Ms. Nur Fadzliana Ramli

Multimedia, Publicity and Promotion

Dr. Nik Noor Asyikin Nik Abd Razak
Mrs. Ainul Huda Ayu Anuar Aziz
Ms. Nur Awanis Sirat
Ms. Nor Izzati Hashim

Beverages, Banquet, Banquet Tentative

Dr. Azhar Abdul Rahman
Dr. Tan Kok Chooi
Dr. Suhana Arshad
Mr. Noor Aswafi Ahmad Zaini
Mr. Mohd. Rizal Mohamad Rodin
Mr. Hazhar Hassan
Mrs. Haslinda Musa

Publication and Scientific Materials

Prof. Dr. Mohd. Zubir Mat Jafri
Assoc. Prof. Dr. Shahrom Mahmud
Dr. Ahmad Fairuz Omar

Technical and Logistic

Dr. Mohd Zamir Pakhuruddin
Mr. Norazam Ariffin
Mr. Mohd Noor Fakarruddin Abdullah
Mr. Mohamed Mustaqim Abu Bakar
Mr. Jasnisuhardi Abdul Manab
Mr. Muhammad Anis Ibnu Hajar
Mr. Shahil Ahmad Khosaini

Certificates, Gifts, Conference Kit
Dr. Nurul Zahirah Noor Azman
Dr. Ramzun Maizan Ramli
Ms. Munirah Jamil

Mr. Muhammad Hazritz Haslan
Ms. Fatin Izzati Hamarudin
Ms. Siti Zulaikha
Mr. Mohd Sharifuddin Al- Fajri

Reviewers

Professor Dato' Dr. Roslan Abd Shukor
Professor Dr. Halimah Mohamed Kamari
Professor Dr. Abdul Razak Ibrahim
Professor Dr. Mohd Zubir Mat Jafri
Associate Professor Dr. Shahrom Mahmud
Associate Professor Dr. Khaulah@ Che Som binti Sulaiman
Associate Professor Dr. Ahmad Nazlim Yusoff
Associate Professor Dr. Nafisah Osman
Associate Professor Dr. Kong Wei
Associate Professor Dr. Azhan Hashim
Associate Professor Dr. Chen Soo Kean
Dr. Azman Kassim
Dr. Wan Yusmawati Wan Yusoff
Dr. Raba'ah Syahidah binti Azis
Dr. Ahmad Fairuz Omar
Dr. Suhana Arshad
Dr. Azhar Abdul Rahman
Dr. Nurul Zahirah Noor Azman
Dr. Mohd Marzaini Mohd Rashid
Dr. Mohd Zamir Pakhuruddin
Dr. Saiful Najmee Mohamad
Dr. Tan Kok Choi
Dr. Siti Azrah Mohamad Samsuri
Dr. Wan Maryam Wan Ahmad Kamil
Dr. Nik Noor Ashikin Nik Ab Razak
Dr. Muhammad Noorazlan bin Abd Azis
Dr. Iskandar Shahrim Mustafa

Sponsors



Associate Sponsors



MASS Micrograph Award 2017 Sponsor



Acknowledgements

Universiti Sains Malaysia (USM)
Media & Public Relations Centre, USM

Centre for Instructional Technology and Multimedia, USM
Centre for Knowledge, Communication & Technology, USM

Olive Tree Hotel, Penang
Penang Tourism

All individuals who helped and contributed to making this conference a success!