

Preface

This volume contains some selected papers from The 2nd International Conference on Sustainable Materials (ICoSM2013) which was held on 26th – 27th March 2013 in Penang, Malaysia and was organized by School of Materials Engineering, Universiti Malaysia Perlis. The conference aims to provide an excellent forum for research scientists in academia and industry around the globe to present and discuss their latest research on a broad array of topics in current and future sustainable materials engineering technologies which drives most of our technological based economy today.

This volume covered all the aspects of sustainable materials engineering on a fundamental and technological aspect, with a focus to the materials recycling related industries. In this gathering, the materials/metals recycling is the prime addressing both technological and sustainability issues within the materials recycling and value adding waste or low-grade materials as well as to the products those have the reinforcement to the economy. All of the papers have been reviewed by more than two expert referees in their relevant topic disciplines. The paper selected for this volume depended on their quality and relevancy to the conference.

The editors hope that this volume will provide the reader a broad overview of the latest research in the field of sustainable materials engineering technologies, and that will be as valuable reference source for further research.

The editors would like to express their sincere appreciations and thanks to all the committee members of the ICoSM2013 for their tremendous efforts. Without their dedication, it was impossible to have a successful ICoSM2013 and a high quality volume of the conference proceedings. Thanks also to Trans Tech Publications for producing this volume. Finally, the editors would like to thank all the authors for their contribution to this valuable volume.

Universiti Malaysia Perlis, MALAYSIA
March, 2013

ICoSM2013 Executive Committee

Patron

Brig. Jen. Dato' Prof. Dr. Kamarudin Hussin

International Advisor

Prof. Veena Shahajwala (University of New South Wales, Australia)

Dr. R. Vasant Kumar (University of Cambridge, United Kingdom)

Prof. Dr. Ali Hussain Reshak (South Bohemia University, Czech Republic)

Prof. Dr. Han Huang (University of Queensland, Australia)

Associate Prof. Dr. Kazuhiro Nogita (University of Queensland, Australia)

National Advisor

Prof. Dr Esah Hamzah (Universiti Teknologi Malaysia)

Prof. Dr. Andanastuti Muchtar (Universiti Kebangsaan Malaysia)

Prof. Ir. Dr. Mohamad Nor Berhan (Universiti Teknologi Mara)

Prof. Dr. Zainal Arifin Ahmad (Universiti Sains Malaysia)

Prof. Dr. Norhamidi Muhamad (Universiti Kebangsaan Malaysia)

Committee Advisor

Dr. Khairel Rafezi Ahmad

Prof. Dr. Shamsul Baharin Jamaludin

Assoc. Prof. Che Mohd Ruzaidi Ghazali

Mr Mustafa Al Bakri Abdullah

Chairman

Prof. Azmi Rahmat

Deputy Chairman

Dr. Mohd Sobri Idris

Secretary

Mohd Arif Anuar Mohd Salleh

Juyana Abd. Wahab

Treasury

Dr. Sharifah Shahnaz Syed Abu Bakar

Mrs. Norina Hidayu Jamil

Conference Committee

Editorial Board

Prof. Dr. Shamsul Baharin Jamaludin (L)
Prof. Dr. Mohd Noor Ahmad
Assoc. Prof. Che Mohd Ruzaidi Ghazali
Assoc. Prof. Dr. Abdullah Chik
Dr. Mazlee Mohd Noor (Coordinator)
Dr. Md Fazlul Bari
Dr. Muhammad Asri Idris
Dr. Kahtan S Muhammad
Dr. Mohd Nazree Derman
Dr. Yeoh Cheow Keat
Dr. Khairel Rafezi Ahmad
Dr. Banjuraizah Johar
Dr. Hakimah Osman
Dr. Teh Pei Leng

Secretariat & Registration

Mrs. Noor Mariamadzliza Mohd Nan (L)
Mrs. Noorazira Md Noor
Mrs. Kamrosni Abdul Razak
Mr. Lokman Hakim Ibrahim

Proceeding & Publishing

Mr. Ruhiyuddin Mohd Zaki (L)
Mr. Murizam Darus
Mr. Faizul Che Pa
Dr. Jalilah Jalil
Mrs. Syarifah Nuraqmar Syed Mahmud

Food & Hotel

Ms. Rohaya Abdul Malek (L)
Mr. Suhardy Daud
Dr. Zuraidawani Che Daud
Dr. Mst. Noorzahan Begum
Mrs. Siti Hawa Mohd Salleh

Publicity

Mr. Muhamad Qauyum Zawawi (L)
Assoc. Prof. Dr. Ir. Salmah
Assoc. Prof. Dr. Supri Abd Ghani
Dr. Ong Hui Lin
Dr. Du Ngoc Uy Lan
Dr. Irwana Nainggolan
Mr. Mohd Zaheruddin Kasmuin
Mrs. Sri Asliza Md Amin
Mrs. Nor Azura Abdul Rahim
Mr. Ku Hasrin Ku Abdul Rahman
Mr. Saifull Akmal Nordin
Mr. Saiful Nizwan Mohd Saleh

Event Managerial Team

Dr. Luqman Musa (L)
Dr. Rozyanty Rahman

Mrs. Yusrina Daud
Mr. Mohammad Tamizi Selimin
Mr. Mohamed Faisol Mohamed Nor

Protocol, Special Task & Transportation

Dr. Nik Noriman Zulkepli (L)
Mr. Muhammad Salihin Zakaria
Mr. Ahmad Azrem Azmi
Dr. Firuz Zainuddin
Dr. Dewi Suriani Che Halin
Mrs. Salmie Suhana Che Abdullah
Mrs. Sinar Arzuria Adnan
Ms. Siti Sarah Ibrahim
Mrs. Rasidah Abdul Wahab

Poster & Exhibition

Mr. Muhammad Hafiz Zan@Hazizi (L)
Mr. Mohamad Safwan Isa
Mr. Mohd Aizat Abd Rahman
Mr. Mohd Mujahidin Suhaimi
Ms. Muthmirah Ibrahim
Mr. Hasmizul Hashim

Sponsorship

Mr. Shaiful Rizam Shamsudin (L)
Mr. Mohd Mustafa Al Bakri Abdullah
Mr. Chek Idrus Omar
Dr. Norzilah Abdul Halif
Mr. Azmi Kamardin
Mrs. Nur Hidayah Ahmad Zaidi
Mrs. Aimi Noorliyana Hashim
Ms. Azida Azmi
Mrs. Haiza Haroon
Mrs. Liyana Jamaludin
Mrs. Nurul Huda Bashirom
Mrs. Azilawati Abdullah
Ms. Norasmira Othman

Website

Mr. Wan Mohd Arif Wan Ibrahim (L)
Mr. Lokman Hakim Ibrahim

Technical /Special Task

Mr. Shahrizam Saad (L)
Mr. Ismail Ibrahim
Mr. Mohd Nasir Haji Ibrahim
Mr. Mohd Tajuddin Mohd Idris
Mr. Azmi Aziz
Mr. Ahmad Hadzrul Iqwan Jalaludin
Mr. Sazali Saad
Mr. Rosmawadi Othman
Mr. Norzaidi Zainol
Mr. Mohammad Faisal Rusli