Preface

The 12th International Symposium on Eco-Materials Processing and Design (ISEPD2011) was held on January 8-11, 2011 at the Empress Hotel, Chiang Mai, Thailand. The ISEPD2011 provided a forum where researchers were able to present the most advanced and new scientific findings and technological developments in the field of eco-materials processing and design. The aim of the symposium was to overview the current status and to foresee the future trends in the field of eco-materials processing and design for energy, environment and related materials.

There were 12 plenary lectures, and a number of invited lecturers and poster presentations participated in 11 different sessions. Many fruitful and exciting research achievements were presented in the symposium, both as the fundamental subjects and application uses, such as solar sustainable energy, fuel cells, photochemistry, porous materials, biomasses, and bio-inspired technology for developing microstructure on superior surface as well as bulk properties. This symposium provided a good chance for scientists to communicate and exchange their opinions and ideas among them.

We would sincerely appreciate the International Advisory Committee, Organizing Committee, plenary lectures, and all participants. We do hope that the manuscripts of the proceedings of all presentations at the ISEPD2011 will be accepted as an original and valuable contribution to the literature in the field of eco-materials processing and design.

Memorial photo of participants in the ISEPD2011 on January 9, 2011, at the Empress Hotel, Chiang Mai, Thailand.

Editors: Hyung Sun Kim, Jian Feng Yang, Chul Hee Han, Somchai Thongtem, and Soo Wohn Lee
Organizing Committee

Symposium Chair
Somchai Thongtem, Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Thailand

General Chairs
Koichi Niihara, Nagaoka University of Technology, Japan
Kozo Ishizaki, Nagaoka University of Technology, Japan
Soo Wohn Lee, Sun Moon University, Korea
Yubao Li, Sichuan University, China

Honorary Chairs
Pongsak Angkasith, President of Chiang Mai University, Thailand
Sampan Singharajwarapan, Dean of Faculty of Science, Chiang Mai University, Thailand

Academic Committee
Byung Hee Hong, Sungkyunkwan University, Korea
Lian Gao, Shanghai Institute of Ceramics, China
Takashi Tomita, The University of Tokyo, Japan
Jing Sun, Shanghai Institute of Ceramics, China
Jae Sung Lee, Pohang University of Science and Technology, Korea
Osamu Takai, Nagoya University, Japan
Lei Jiang, Chinese Academy of Sciences, China
L.D. Yu, Chiang Mai University, Thailand
Feng Pan, Tsinghua University, China
Supab Choopun, Chiang Mai University, Thailand
Emile H. Ishida, Tohoku University, Japan
Hideo Nakajima, Osaka University, Japan
Masaya Matsuoka, Osaka Prefecture University, Japan
Masato Takeuchi, Osaka Prefecture University, Japan
Yuichi Ichihashi, Kobe University, Japan
Takamasa Onoki, Osaka Prefecture University, Japan
Shinya Higashimoto, Osaka Institute of Technology, Japan
Kosuke Mori, Osaka University, Japan
Takashi Kamegawa, Osaka University, Japan
Shu Yin, Tohoku University, Japan
Eiji Tani, Advanced Industrial Science and Technology (AIST), Japan
Yoshihiro Hirata, Kagoshima University, Japan
Tadachika Nakayama, Nagaoka University of Technology, Japan
Takanori Watari, Saga University, Japan
Hao Wang, Wuhan University of Technology, China
Xuebin Zheng, Shanghai Institute of Ceramics, China
Yi Zeng, Shanghai Institute of Ceramics, China
Guan-Jun Qiao, Xi’an Jiaotong, University, China
Li Fu, Northwestern Polytechnical University, China
Hyung Sun Kim, Inha University, Korea
Young Hee Kim, KICT, Korea
Won Yong Kim, KITECH, Korea
Kyung Nam Kim, Gangwon University, Korea
Sang Yup Park, Kangnung University, Korea
Hyung Mee Lim, KICET, Korea
Kwang Bo Shim, Hanyang University, Korea

Publication Committee
Hyungsun Kim (Inha University, Korea)
Tohru Sekino (Tohoku University, Japan)
Jian Feng Yang (Xi’an Jiaotong University, China)
Cheol Hee Han (Sun Moon University, Korea)
Soo Wohn Lee (Sun Moon University, Korea)
Yu Bao Li (Sichuan University, China)
Yonghee Kim (KICET, Korea)
Bo Young Hur (Gyeongsang National University, Korea)
Dong Sik Bae (Changwon National University, Korea)
Kyung Nam Kim, (Gangwon University, Korea)
Wenbin Cao (University of Science and Technology Beijing, China)
Jun Yang (Xi’an University of Architecture and Technology, China)

Symposium Organizing Committee
Winita Punyodom, Chiang Mai University, Thailand
Atcharawoon Gardchareon, Chiang Mai University, Thailand
Hyungsun Kim (Inha University, Korea)
Tohru Sekino (ISIR, Osaka University, Japan)[changed to Tohoku University, Japan ]
Jian Feng Yang (Xi’an Jiaotong University, China)
Cheol Hee Han (Sun Moon University, Korea)
Soo Woon Lee (Sun Moon University, Korea)
Yu Bao Li (Sichuan University, China)
Sang Yeup Park (Kangnung National Univ., Korea)
Yonghee Kim (KICET, Korea)
Hyungmi Lim (KICET, Korea)
Won Yong Kim (Korea Institute of Industrial Technology, Korea)
Bo Young Hur (Gyeongsang National University, Korea)
Dong Sik Bae (Changwon National University, Korea)
Apinon Nantiya, Chiang Mai University, Thailand
Arnon Chaipanich, Chiang Mai University, Thailand
Yongyuth Laosiritaworn, Chiang Mai University, Thailand
Pensiri Sriburi, Chiang Mai University, Thailand
Thapanee Sarakonsri, Chiang Mai University, Thailand
Vannajan Sanghiran Lee, Chiang Mai University, Thailand
Piyarat Nimmanpipug, Chiang Mai University, Thailand
Suparut Narksitipan, Maejo University, Thailand
Sulawan Kaowphong, Chiang Mai University, Thailand
Anukorn Phuruangrat, Prince of Songkla University, Thailand
Chankit Khanchong, Chiang Mai University, Thailand
Wonchai Promnopas, Chiang Mai University, Thailand

International Advisory Committee
Junichi Hojo, Kyushu University, Japan
Yasuo Uchiyama, Nagasaki University, Japan
Junichi Matsushita, Tokai University, Japan
Jian-Feng Yang, Xi’an Jiaotong University, China
Jun Yang, Xi’an University of Architecture and Technology, China
Ke-Zheng Sang Chang’an University, China
Zhen-Lin Lu Xi’an University of Technology, China
Xianhong Wang, Chang Chun Institute of Applied Chemistry, China
Lian Gao, Shanghai Institute of Ceramics, China
ZhengYi Fu, Wuhan University of Technology, China
Organized by
Faculty of Science, Chiang Mai University, Thailand
Sun Moon University, Korea

Sponsored by
A3 Foresight Program by JSPS, NSFC, NRF
Thailand's Office of the Higher Education Commission for providing financial support through the National Research University (NRU) Project
Materials Science Research Center, Faculty of Science, Chiang Mai University
Nanoscience and Nanotechnology Research Center, Faculty of Science, Chiang Mai University