

ICCCI 2018

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*The 6th International Conference on the
Characterization and Control of Interfaces
for High Quality Advanced Materials
and
the 54th Summer Symposium on
Powder Technology*

Program and Abstracts



**Kurashiki, Japan
July 9–12, 2018**

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Control of Interfaces for High Quality Advanced Materials
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Conference Information

1. Aims and Scope

Interfaces are critically important to a broad spectrum of materials and technologies. In 2003, the first International Conference on Characterization and Control of Interfaces for High Quality Advanced Materials (ICCCI2003) established an international forum for interface science and technology. Interest and participation doubled in 2006, 2009, 2012 and 2015 at the second, third, fourth and fifth International Conferences (ICCCI2006, 2009, 2012 and 2015) respectively. In 2018, the sixth International Conference (ICCCI2018) will continue the discussion on interface characterization and control to design and manufacture high quality advanced materials. Additionally, an industrial exhibition by multinational corporations will complement the technical sessions. At ICCCI2018, interface characterization and control technology for nano-scale to micro-scale materials synthesis, powder processing, composite processing, joining, and to control airborne particulates will be addressed by scientists and engineers from academia, industry, and national laboratories. Conference topics include:

Session A: Interface Characterization and Control for Nanoparticles and Powders (54th Summer Symposium on Powder Technology)

- Solid-liquid interfaces
- Composite interfaces
- Interface characterization techniques
- Interface control for processing
- Control and design of interfaces in suspensions

Session B: Smart Processing Technology

- Advanced materials: ceramics, metals, polymers, composites, porous materials etc.
- Microsystems
- Nanotechnology
- Novel manufacturing: 3D printing etc.
- Advanced joining and welding technology

Session C: International Symposium in Honor of Prof. Olivera Milosevic

Session D: Energy and Environment

- Batteries
- Fuel cells
- Solar cells
- Biomass, Coals
- Recycling
- PM2.5
- Nanorisk

Session E: Material Design and Evaluation

- Bio-materials
- Chemicals and pigments
- Electronic materials
- Pharmaceutical
- Engineering materials
- Microstructure evaluation
- Evaluation of material properties

2. Supporting Organizations and Sponsors

Organized by

The Society of Powder Technology, Japan

Co-Sponsors

Hosokawa Powder Technology Foundation

International Comminution Research Association

Japan Science and Technology Agency

Japan Welding Society

Joining and Welding Research Institute, Osaka University

Kao Corporation

Smart Processing Society for Materials, Environment & Energy

The 124th Committee on Advanced Ceramics, Japan Society for the Promotion of Science

The American Ceramic Society

The Ceramic Society of Japan

The Japan Institute of Energy

The Japan Institute of Metals and Materials

The Japan Society on Adsorption

The Society of Chemical Engineers, Japan

Yamanashi Prefecture

Material Research Society of Serbia

3. Conference Venue

Kurashiki Royal Art Hotel

3-21-19 Achi, Kurashiki, Okayama 710-0055, Japan

Tel: +81-86-423-2400, Fax: +81-86-423-2401

www.royal-art-hotel.co.jp

Room II

Session C: International Symposium in Honor of Prof. Olivera Milosevic

08:00–10:00 Chair: Kevin G. Ewsuk

08:00–08:30 1-II-C-01 INVITED

Design and processing of photoresponsive hierarchical nanomaterials using innovative synthesis routes

O. Milosevic

Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Serbia

08:30–09:00 1-II-C-02 INVITED

Interfaces in electronic packaging: metallurgical challenges in miniaturization

F. Hodaj

Grenoble Institute of Technology, France

09:00–09:30 1-II-C-03 INVITED

Synthesis and characterization of functional ceramic materials at the nano- and microscale with enhanced properties

G. Flores-Carrasco^{1,2}, A. Urbietá³, P. Fernández³, O. Milosevic⁴, M.E. Rabanal¹

¹Carlos III University, Spain, ²Meritorious Autonomous University of Puebla, Mexico,

³Complutense University of Madrid, Spain, ⁴Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Serbia

09:30–10:00 1-II-C-04 INVITED

Characterization of defects in ceramics

K. Uematsu

Uematsu Consulting for Ceramic Technology, Japan

10:00–10:20

Coffee break

10:20–12:00 Chair: Olivera Milosevic

10:20–10:50 1-II-C-05 INVITED

Synthesis of nanocarbons and ilmenites nanoparticles using super-high-energy ball milling

S. Ohara

Osaka University, Japan

10:50–11:10 1-II-C-06 INVITED

Photocatalytic efficiency of TiO₂/Ag nanoparticles modified cotton fabric

M. Milošević, M. Radoičić, Z. Šaponjić

University of Belgrade, Serbia

11:10–11:30 1-II-C-07 INVITED

Magnetically recoverable photocatalysts based on metal oxide nanostructures (Fe and Zn)

L. González^{1,2}, L. Muñoz-Fernandez¹, G. Flores-Carrasco^{1,3}, O. Milosevic⁴, G. Salas², M.E. Rabanal¹

¹Carlos III University, Spain, ²IMDEA Nanociencia, Spain, ³Meritorious Autonomous University of Puebla, Mexico, ⁴Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Serbia

12:00–13:20

Photo and Lunch

I-II-C-07 INVITED

11:10–11:30, July 10, Room II

Magnetically recoverable photocatalysts based on metal oxide nanostructures (Fe and Zn)

L. González^{1,2)}, L. Muñoz-Fernandez¹⁾, G. Flores-Carrasco^{1,3)}, O. Milosevic⁴⁾,
G. Salas²⁾, M.E. Rabanal¹⁾

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³⁾ CIDS-ICUAP Benemérita Universidad Autónoma de Puebla, México

⁴⁾ Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Serbia

The synthesis of $\gamma\text{-Fe}_2\text{O}_3\text{&ZnO}$ hybrid nanocomposites has been carried out by a solvothermal process at low temperature evaluating the influence of different experimental parameters and conditions. Several techniques such as X-Ray diffraction (XRD), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (HR-TEM), Vibrating Sample Magnetometry (VSM), Coupled Plasma-Optical Emission Spectroscopy (ICP-OES), Dynamic Light Dispersion (DLS), Thermogravimetric Analysis (TGA) and UV-Vis Spectroscopy have been used to characterize the size, shape, structure, chemical composition, purity, crystalline phase and spectroscopic, magnetic, and finally the photocatalytic properties of nanocomposites prepared. Based on the results obtained, under irradiation of UV-Vis light, the nanocomposites of $\gamma\text{-Fe}_2\text{O}_3\text{-ZnO}$ synthesised both at 6 h and 12 h at 120 °C demonstrate a high photocatalytic activity (PCA) compared to pure $\gamma\text{-Fe}_2\text{O}_3$ and ZnO samples for the degradation of methylene blue (MB), used as a cationic dye model. The percentage of degradation obtained for both cases was much higher than that obtained for the pure compounds of $\gamma\text{-Fe}_2\text{O}_3$ and ZnO (85% and 81% vs 51% and 46%, respectively). Also, the study of stability, magnetic recovery and recyclability in MB dye degradation was carried out. For this purpose, photocatalytic tests were performed by reusing these hybrid nanocomposites during successive cycles. It has been verified that the PCA of these nanocomposites is maintained after several cycles of experiments with new MB solutions demonstrating their high photocatalytic stability. In conclusion, $\gamma\text{-Fe}_2\text{O}_3\text{-ZnO}$ hybrid nanostructures are a suitable candidate for its use in environmental applications, and to solve problems of removal of organic contaminants in the wastewater treatments as a magnetically recoverable photocatalyst.