



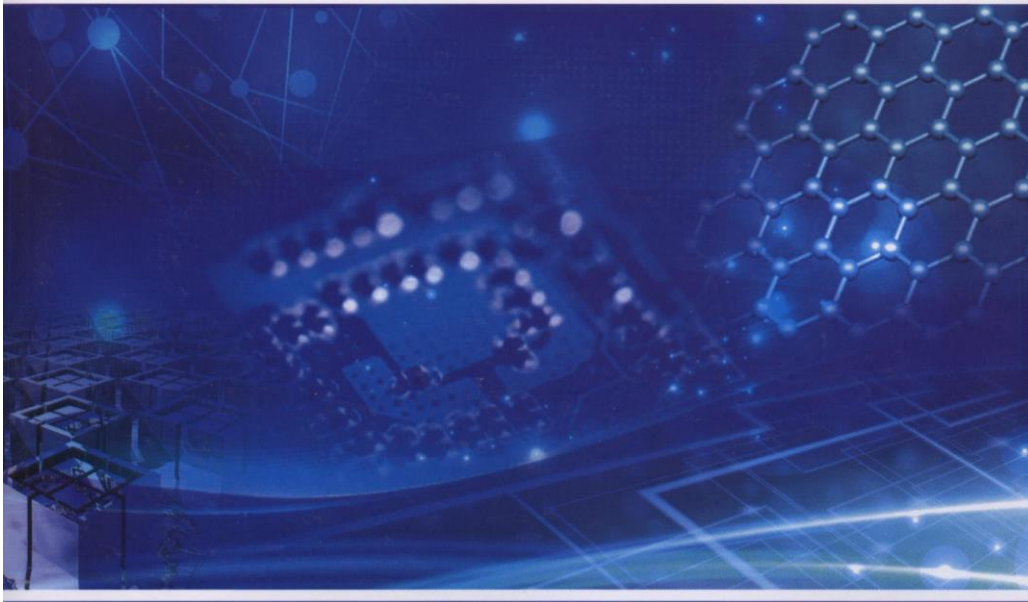
Smart Materials

## BIT's 2<sup>nd</sup> Annual World Congress of Smart Materials-2016

Theme: Develop New Path of Smartness

Time: March 4-6, 2016

Venue: Grand Copthorne Waterfront Hotel, Singapore



会刊 Conference  
Abstract Book

*Soft Copy*



## Table of Content

### Introduction to Program

List of Organizing Committee and Event Organizers	
Welcome Remark	
Table of Content	001
Program	012

### Keynote Forum

Speakers' Profiles	056
<i>Dr. Benjamin S. Hsiao, Dr. W. I. Milne, Dr. Jianguo Lin, Dr. Edward Yi Chang</i>	
<i>Dr. Jiangfeng Du</i>	

### Symposium 1: Adaptive Structures and Intelligent Systems

#### Focus 101: Breaking Research of Smart Materials Science and Technologies 064

Speakers' Profiles	
<i>Dr. Takayuki Ohba, Dr. I. M. Dharmadasa, Dr. Marek Gorywoda, Dr. Masafumi Unno,</i>	
<i>Dr. Michinori Takeshita, Dr. Martin Pfeiffer, Dr. Shuji Ogata, Dr. Sakari Kulmala,</i>	
<i>Dr. Mart Min, Dr. Byoung S. Ham, Dr. Toshihiko YOSHIMASU, Dr. Hiroshi Kumigashira,</i>	
<i>Dr. Seiichi Miyazaki, Dr. Marlena Gryl, Dr. Francesco Picchioni</i>	

#### Focus 102: Micro-systems and Nano-systems 082

Speakers' Profiles	
<i>Dr. Renshi Sawada, Dr. Masami Takayama, Dr. Sandhya Kulkarni,</i>	
<i>Dr. Francesco Cottone, Dr. Kah-Wee Ang, Dr. Kok Swee Leong, Dr. Aiichiro Nagaki,</i>	
<i>Dr. Kin-Fong Lei</i>	

#### Focus 103: Smart Actuators, Sensors and Smart Material Systems 092

Speakers' Profiles	
<i>Dr. Xiaoyi Bao, Mr. Sergio Nicoletti, Dr. Makoto Yamada, Dr. Eung-Soo Kim,</i>	
<i>Dr. Ikhwana Elfitri, Dr. Tsuyoshi Uchiyama, Dr. Daniele Tosi, Dr. Yuanhui Zheng,</i>	
<i>Dr. Liya Ge, Dr. Takahiro Yamashita, Dr. Marco Mazza</i>	

#### Focus 104: Smart Robots 106

Speakers' Profiles	
<i>Dr. Noriyuki Kawarazaki, Dr. Meng Joo Er, Dr. Haruhisa Kawasaki</i>	

#### Focus 105: Smart Structures in Mechatronics 112

Speakers' Profiles	
<i>Dr. Yves Bernard, Dr. Peng-Sheng Wei, Dr. Akira Miyamoto, Dr. Hassan Hariri</i>	



## Symposium 2: Structural Materials

### Focus 201: Carbon, Graphite and Graphene Technologies (Part 1) 118

#### Speakers' Profiles

*Dr. Laurent Simon, Dr. Genhua Pan, Dr. Kun'ichi Miyazawa, Dr. Peter I Belobrov,  
Dr. Piotr Kula, Dr. Baoping Jia, Dr. Masaru Tachibana, Dr. José Daniel Biasoli de  
Mello, Dr. Balint Najradi, Dr. Wataru Norimatsu, Dr. Chan-Cuk Hwang,  
Dr. Ana Neves, Mr. Yana Mulyana, Dr. Ray Gibbs*

### Focus 201: Carbon, Graphite and Graphene Technologies (Part 2) 134

#### Speakers' Profiles

*Mr. J. Patrick Frantz, Dr. Mikhail Popov, Dr. Sebastiano Ravesi, Dr. Sombel Diahm,  
Dr. Jerzy P. Lukaszewicz, Dr. Wojciech Kempinski, Dr. Mariano Palomba,  
Dr. Zhi-Bin Zhang, Dr. Irina Antonova, Dr. Mathieu G. Silly, Dr. Adelina Ilie,  
Dr. Liang Zheng Tan, Dr. Junzhong Wang, Dr. Preeti Nigam Joshi*

### Focus 202: Smart Metals 150

#### Speakers' Profiles

*Dr. Karl Ulrich Kainer, Dr. Shin-ichi Shamoto, Dr. L. A. Yolshina, Dr. Soshu Kirihara,  
Dr. Yuichi Shimazaki, Dr. Sofia Capelo, Dr. Jiang Ma*

### Focus 203: Smart Polymers (Part 1) 160

#### Speakers' Profiles

*Dr. Patrice Woisel, Dr. Eric Buhler, Dr. Haruyuki Okamura, Dr. Yasuhiro Koike,  
Mr. Ignacio Muñoz de Juan, Dr. Yusuke Tsuda, Dr. Pil J. Yoo, Dr. Atsushi Nagai*

### Focus 203: Smart Polymers (Part 2) 170

#### Speakers' Profiles

*Dr. Fumitoshi Kakiuchi, Dr. Marek Szostak, Dr. Yasuhiro Morisaki,  
Dr. José Vidal Gancedo, Dr. Aminul Islam, Dr. Bernabe L. Rivas, Dr. J. C. Viana,  
Dr. Mihaiela C. Stuparu, Dr. Hanul Moon*

### Focus 204: Smart Rubber and Fiber 182

#### Speakers' Profiles

*Mr. Kurt Manigatter, Dr. Toshihiro Hirai, Dr. Chung Hee Park, Dr. Thomas Mayer-  
Gall, Dr. Martyna Pingot, Dr. Tao Hua, Dr. Julien Ferec, Dr. Tasuku Nakajima,  
Dr. Alexander Büsgen*

## Symposium 3: Smart Nanomaterials

### Focus 301: Nanopowders and Nanoparticle (Part 1) 194

#### Speakers' Profiles

*Dr. Xiaoyu Yang, Dr. Raul Arenal, Dr. Pradip Kumar, Dr. Buket Aksu,  
Dr. Shin-ichi Naya, Dr. Agnieszka Jastrzebska, Dr. Karol Vegso, Dr. Koichiro Hayashi,  
Dr. Israel Felner, Dr. Sevgi Gungor, Dr. M. Clara Goncalves, Dr. Catherine Amiens*



- 08:50-09:10 **Title:** *Hidden Lattice Structures in Functional Materials - Optical Recording and Negative Thermal Expansion Materials*  
**Dr. Shin-ichi Shamoto**, Senior Principal Researcher, Advanced Science Research Center, Japan Atomic Energy Agency, Japan
- 09:10-09:30 **Title:** *Novel Metal-graphene Metallic Composites with the Unique Mechanical and Electrochemical Properties*  
**Dr. L. A. Yolshina**, Head, Power Sources laboratory, Urals Branch of Russian Academy of Sciences, Russia
- 09:30-09:50 **Title:** *Fabrication of Smart Metal Patterns with Functional Structures for Distribution Control of Electromagnetic and Mechanical Energies*  
**Dr. Soshu Kirihara**, Associate Professor, Osaka University, Japan
- 09:50-10:10 **Title:** *Oxidation Chemistry of Metal(II)-diphenolato Complexes with Salen-Type Ligands; Electronic Structure and Reactivity Relationship*  
**Dr. Yuichi Shimazaki**, Associate Professor, Ibaraki University, Japan
- 10:10-10:30 **Title:** *Progress in Corrosion Studies of Non-noble Dental Alloys*  
**Dr. Sofia Capelo**, Assistant Professor, Évora University, Portugal
- 10:30-10:50 **Title:** *Micro Thermoplastic Forming of a Pd-based Metallic Glass*  
**Dr. Jiang Ma**, Shenzhen University, China

**Focus 203: Smart Polymers ---Part 1**

*Time: 08:30-12:10, March 6, 2016 (Sunday); Place: Riverfront II, 2<sup>nd</sup> Floor*

**Chair** **Dr. Eric Buhler**, Professor, University Paris Diderot, France

**Co-Chair** **Mr. Munoz Ignacio**, CEO and Founder, Molecor, Spain

- 08:30-08:55 **Keynote Speech:**  
**Title:** *Supramolecular Chemistry: A Powerful Tool to Elaborate "Colourful" Multi-stimuli Responsive Macromolecular Assemblies*  
**Pr. Patrice Woisel**, Professor, Lille University, France
- 08:55-09:20 **Title:** *Behavior of Supramolecular Self-assemblies*  
**Dr. Eric Buhler**, Physics Professor, Paris Diderot University, France
- 09:20-09:45 **Title:** *Synthesis of i-Line or g-Line Sensitive Photoacid Generators and Their Application to Smart Polymeric Systems*  
**Dr. Haruyuki Okamura**, Associate Professor, Osaka Prefecture University, Japan
- 09:45-10:10 **Title:** *Advanced Photonics Polymers for 4K/8K Ultra-High Resolution Display and Data Transmission*  
**Dr. Yasuhiro Koike**, Professor, Keio University, Japan; Director, Keio Photonics Research Institute, Japan
- 10:10-10:30 **Coffee Break**
- 10:30-10:55 **Title:** *PVC-O: The New Material for Changing the Piping Business*  
**Mr. Ignacio Munoz de Juan**, CEO and Founder, Molecor, Spain
- 10:55-11:20 **Title:** *Surface Wettability Controllable Polyimides by UV Light Irradiation*  
**Dr. Yusuke Tsuda**, Professor, Kurume National College of Technology, Japan



### Title: Progress in Corrosion Studies of Non-noble Dental Alloys

*Dr. Sofia Capelo*

Assistant Professor  
Évora University  
Portugal

#### Abstract

The corrosion behaviour of metals plays a decisive role in evaluating the use of metal alloys as biomaterials; thus, the in vitro evaluation of metallic material corrosion resistance represents an important stage in the process of developing new biomaterials. Dental alloys used in oral rehabilitation are to be kept in contact with the patient saliva for several years, thus they need to be resistant to corrosion in the presence of the oral cavity fluid. During the corrosion process, ions that may have adverse effects for the human health may be released. A potential difference of a few or various mV may be established as well as galvanic currents flowing through the saliva and the metallic contacts with metallic ions release. Another aspect is the development of cheap and anticorrosive dental material. The high costs of noble dental alloys have led to the development of various alloy materials, which are more economical. Cr-based alloys are among

the most common materials applied in dentistry and in implants. The evaluation results of the corrosion resistance of two Cr-based non-noble alloys will be presented and discussed.

#### Biography

Dr. Sofia Capelo, Chemist Doctor (Ph.D.-chemistry), is Assistant Professor of Environmental Chemistry at the University of Évora since 1996. She has a degree and a Ph.D. in chemistry from the Faculty of Sciences (FCUL) and the Higher Technical Institute (IST) of the University of Lisbon, respectively. She is a member of the Institute of Mediterranean Agricultural and Environmental Sciences (ICAAM) and a collaborator of the Interdisciplinary Center for History, Cultures and Societies (CIDEHUS). Recently, she has been appointed Director of the degree programme in Ecology and Environment of the University of Évora. The general domain of specialization is environmental chemistry. More specific topics are metal corrosion (dental alloys; heritage), electrochemistry, monitoring and remediation of acid waters contaminated with metals, with a patent entitled "Remediation process for acid waters contaminated with heavy metals" (PT103723-20/04/2007).