

***Preliminary Program***

*(June 14, 2017)*

**6<sup>th</sup> International Conference on**  
**Electrophoretic Deposition:**  
**Fundamentals and Applications**

**October 1-6, 2017**  
Gyeongju, South Korea

**Conference Chair**

**Prof. Aldo R. Boccaccini**  
Department of Materials Science and Engineering  
University of Erlangen-Nuremberg, Germany

**Conference Co-Chairs**

**Prof. Omer Van der Biest**  
Department of Metallurgy and Materials Engineering  
Katholieke Universiteit Leuven, Belgium

**Prof. James Dickerson**  
Center of Functional Nanomaterials  
Brookhaven National Laboratory, USA

**Dr. Tetsuo Uchikoshi**  
National Institute for Materials Science, Japan



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## **Sunday, October 1, 2017**

16:00 – 18:00	Conference Check-in
18:00 – 20:00	Welcome Reception and Dinner

### **Notes**

- *Technical sessions will be in the Convention Hall C.*
- *Poster Sessions will be in the Convention Hall B.*
- *Breakfast will be in the Topaz Restaurant (hours 7 am to 10 am)*
- *Lunches and dinners will be in the Convention Hall A.*
- *Audiotaping, videotaping and photography of presentations are prohibited.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3-5 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

### **About Gyeongju**

Gyeongju is Korea's ancient cultural city, the capital of the once great Silla Kingdom (BC 57~AD 935). It is located approximately 350 km southeast of Seoul. When the Silla Kingdom reached the peak of its development, Gyeongju was estimated to have one million residents – four times its current size. UNESCO designated it both as one of ten World Heritage sites in Korea and as one of the world's ten most important ancient cultural cities, both for its position in the historical and cultural development of East Asia and for its role in the formation of the Korean nation. Because of the vast number of archeological sites and cultural properties that remain in this city, Gyeongju is often referred to as "the museum without walls". It is the main destination in South Korea for visitors interested in the cultural heritage of Silla and the architecture of the Joseon Dynasty.

**Monday, October 2, 2017**

07:30 – 08:30 Breakfast buffet

08:30 – 08:45 Conference Introduction by Conference Chair and Co-Chairs

***SESSION I: FUNDAMENTALS OF EPD PROCESS AND MODELLING I***

**Session chair:** Laxmidhar Besra

08:45 – 09:15 **Keynote**  
DYNAMIC MESOSCALE MODEL OF REVERSIBLE ELECTROPHORETIC DEPOSITION.  
Brian Giera  
Lawrence Livermore National Laboratory, USA

09:15 – 09:35 AN EFFECTIVE MODELLING AND NUMERICAL INVESTIGATION ON ELECTROPHORETIC DEPOSITION  
Jae Sung Park  
University of Nebraska-Lincoln, USA

09:35 – 09:55 SIMULATION OF ELECTROPHORETIC DEPOSITION PROCESS BY PHASE-FIELD METHOD  
Babak Raissi  
Materials & Energy Research Center, Iran

09:55 – 10:15 INSIGHT INTO NANOPARTICLE CHARGING MECHANISM IN NONPOLAR SOLVENTS TO CONTROL THE FORMATION OF PT NANOPARTICLE MONOLAYERS BY ELECTROPHORETIC DEPOSITION  
Ondřej Černohorský  
Institute of Photonics and Electronics, AS CR, Czech Republic

10:15 – 10:35 BEHAVIOR OF CURRENT DURING CONTROLLED POTENTIAL EPD OF NA-MONTMORILLONITE ON STAINLESS STEEL  
Ivyleen B. Arugay,  
Mindanao State University- Iligan Institute of Technology, Philippines

10:35 – 11:00 Coffee Break

***SESSION II: FUNDAMENTALS OF EPD PROCESS AND MODELLING II***

**Session chair:** Lobat Tayebi

11:00 – 11:20 MODELING APPROACHES IN ELECTROPHORETIC DEPOSITION  
Scott C. Bukosky  
Lawrence Livermore National Laboratory, USA

11:20 – 11:40 IMPEDANCE OF STAINLESS STEEL COATED WITH SODIUM-MONTMORILLONITE BY ELECTROPHORETIC DEPOSITION  
Ivyleen B. Constantino  
Mindanao State University-Iligan Institute of Technology, Philippines

11:40 – 12:00	Discussion of EPD Modelling Sessions
12:00 – 14:00	Lunch
14:00 – 16:30	<i>Ad hoc</i> sessions and/or free time
16:30 – 17:00	Afternoon Coffee
	<b><i>SESSION III: COATINGS I</i></b>
	<b><u>Session chair:</u></b> Stephan Barcikowski
17:00 – 17:20	STRUCTURAL COLOR COATING FILMS COMPOSED OF AN AMORPHOUS ARRAY OF SILICA AND CARBON BLACK PARTICLES BY ELECTROPHORETIC DEPOSITION Kiyofumi Katagiri Hiroshima University, Japan
17:20 – 17:40	INVESTIGATION OF MULTI-STAGE DEPOSITION TECHNIQUES OF INDUSTRIAL EPD PAINT FOR HIGH FILM THICKNESS AND MULTI-LAYER APPLICATIONS. Peter Hope LVH Coatings Ltd, United Kingdom
17:40 – 18:00	SYNTHESIS AND CHARACTERIZATION OF NANOCOMPOSITES COATING BASED ON INORGANIC OCTAHEDRAL CLUSTER UNITS FABRICATED BY ELECTROPHORETIC DEPOSITION PROCESS. Fabien Grasset CNRS, France
18:00 – 18:20	HIGHLY ADHERENT CORROSION RESISTANT COATING OF AL <sub>2</sub> O <sub>3</sub> -NI CORE-SHELL PARTICLES ON MILD STEEL BY ELECTROPHORETIC DEPOSITION Laxmidhar Besra Institute of Minerals and Materials Technology (IMMT), India
18.20 – 19.30	<b><i>SESSION IV: POSTER SESSION I</i></b>
19:30 – 21:00	Dinner
21:00 – 22:00	Social Hour

**Tuesday, October 3, 2017**

07:30 – 08:30 Breakfast buffet

**SESSION V: NOVEL EXPERIMENTAL TECHNIQUES I**

**Session chair:** Jay Dickerson

08:30 – 09:00 **Keynote**  
STRUCTURING OF ELECTRODE SURFACES WITH LIGAND-FREE  
NANOPARTICLES VIA ELECTROPHORETIC DEPOSITION- FUNDAMENTALS AND  
IN VIVO APPLICATIONS  
Stephan Barcikowski  
University of Duisburg-Essen, Germany

09:00 – 09:20 FABRICATION OF POROUS, CRYSTALLINE-ORIENTED TITANIA LAYER ON  
TRANSPARENT ELECTRODE BY MAGNETIC FIELD-ASSISTED EPD  
Tetsuo Uchikoshi  
National Institute for Materials Science, Japan

09:20 – 09:40 ELECTROPHORETIC DEPOSITION OF B<sub>4</sub>C/AL CERMETS IN A 3D GEOMETRY  
WITH GREATER CURVATURE FOR APPLICATIONS IN ARMOR SYSTEMS.  
Jason R. Morales  
Lawrence Livermore National Laboratory, USA

09:40 – 10:00 IN-SITU USAXS/SAXS INVESTIGATION OF TUNABLE STRUCTURAL COLOR IN  
AMORPHOUS PHOTONIC CRYSTALS DURING ELECTROPHORETIC DEPOSITION  
Scott Bukosky  
Lawrence Livermore National Laboratory, USA

10:00 – 10:20 EFFECT OF ELECTROOSMOTIC FLOW ON THE ELECTROPHORETIC  
DEPOSITION OF ZEOLITE POWDER ON A POROUS ALUMINA SUPPORT  
Hideyuki Negishi  
National Institute of Advanced Industrial Science and Technology (AIST), Japan

10:20 – 10:40 FABRICATION AND CHARACTERIZATION OF TITANIA-NANOSHEET FILM BY  
ELECTROPHORETIC DEPOSITION TECHNIQUE  
Jun-ichi Hamagami  
Kanto Gakuin University, Japan

10:40 – 11:20 Coffee Break

**SESSION VI: CERAMICS I**

**Session chair:** Paula M. Vilarinho

11:20 – 11:50 **Keynote**  
APPLICATION OF ELECTROPHORETIC DEPOSITION FOR SOLID OXIDE FUEL  
CELL  
Motohide Matsuda  
Kumamoto University, Japan

- 11:50 – 12:10 ELECTROACOUSTIC CHARACTERIZATION OF SUSPENSIONS FOR THE ELECTROPHORETIC DEPOSITION OF CERAMIC POWDERS  
Kirsten Moritz  
Technische Universität Bergakademie Freiberg, Germany
- 12:10 – 12:30 ENVIRONMENTALLY FRIENDLY PROCESSING OF LEAD FREE SODIUM POTASSIUM NIOBATE THICK FILMS BY ELECTROPHORETIC DEPOSITION  
Maria Elizabete Costa  
University of Aveiro, Portugal
- 12:30 – 12:50 SELECTIVE ELECTROPHORETIC DEPOSITION OF NANOSILICA PARTICLES ON THE INNER ELECTRODES OF MULTILAYERED CERAMIC CAPACITOR  
Ryan Corpuz  
MSU-IIT, Philippines

13:00 – 14:30 Lunch

**SESSION VII: FUNCTIONAL MATERIALS**

Session Chair: Tetsuo Uchikoshi

- 14:30 – 14:50 DEPOSITION AND CHARACTERIZATION OF CDSE AND TIO<sub>2</sub> NANOCOMPOSITE BY ELECTROPHORETIC DEPOSITION FOR QUANTUM DOTS SENSITISED SOLAR CELL  
Aung Kyaw  
Engineering Campus, Universiti Sains Malaysia, Nibong Tebal, Malaysia
- 14:50 – 15:10 ELECTROPHORETIC DEPOSITION OF POLYSTYRENE MICROSPHERES FOR EFFICIENT FABRICATION OF LARGE-AREA COLLOIDAL CRYSTALS  
Pei-Sung Hung  
National Chiao Tung University, Taiwan
- 15:10 – 15:30 ELECTROPHORETIC DEPOSITION OF NANOPARTICLES FOR PHOTO-THERMAL SOLAR RECEPTORS  
Guillaume Toquer  
ICSM, France

15:30 – 16:30 *Ad hoc* sessions and/or free time

**SESSION VIII: OMER VAN DER BIEST SYMPOSIUM**

Session Chair: Aldo R. Boccaccini

- 16:30 – 16:50 Tailored microstructure of ceramics by using electric and magnetic fields  
Tohru S. Suzuki  
National Institute for Materials Science- Japan
- 16:50 – 17.10 Electrophoretic deposition as a method for the preparation of ceramic fuel cells  
Christos Argiris  
National Technical University of Athens, Greece
- 17:10 - 17:30 Thick films of electroceramics by electrophoretic deposition: on the way to devices  
Paula Vilarinho  
University of Aveiro, Portugal

17:30- 17:50	Microporous organic-inorganic nanocomposite coating on stainless steel via EPD for biomedical applications Aldo R. Boccaccini University of Erlangen-Nuremberg, Germany
17:50 – 18:10	Influence of substrate morphology on ZnO nanostructures grown by electrophoretic deposition Omar Espíndola Universidad Nacional de Tucumán. Argentina
18:10 – 18:30	Effect of surface modifiers on the nanoparticles electro-driven assembly Begoña Ferrari Instituto de Cerámica y Vidrio, CSIC, Spain
18:30 – 18:50	An old problem revisited: the electric current during constant voltage electrophoretic deposition Luc Vandeperre Imperial College London. United Kingdom
18:50 – 19:10	Fundamental aspects of solvent-solute interactions in electrodeposition and electrophoretic deposition Gregorio Vargas CINVESTAV Unidad Saltillo, Mexico
19:10 – 19:30	Research on electrophoretic deposition in hindsight and foresight Omer Van der Biest K U Leuven, Belgium
19:30 – 21:00	Dinner
21:00 – 22:00	<i>Social Hour</i>

**Wednesday, October 4, 2017**

07:30 – 08:30 Breakfast buffet

***SESSION IX: EPD OF BIOMATERIALS I***

**Session Chair:** Aldo R. Boccaccini

- 08:30 – 09:00 **Keynote**  
BIOMEDICAL APPLICATIONS OF ELECTROPHORESIS DEPOSITION TECHNIQUE  
Lobat Tayebi  
Marquette University School of Dentistry, USA
- 09:00 – 09:20 LAYER-BY-LAYER ELECTROPHORETIC DEPOSITION OF BIOMEDICAL  
SCAFFOLDS: NOVEL FABRICATION PROCESS AND MATERIAL PROPERTIES  
Arash GhalayaniEsfahani  
Politecnico di Milano, Italy
- 09:20 – 09:40 DEVELOPMENT OF A BIODEGRADABLE NATURAL POLYMER/CERAMIC COATING  
FOR MG ALLOYS USING ELECTROPHORETIC DEPOSITION  
Svenje Heise  
Friedrich-Alexander University Erlangen-Nuremberg, Germany
- 09:40 – 10:00 ELECTROPHORETIC DEPOSITION OF ZEIN/BIOGLASS COMPOSITES WITH  
INCORPORATION OF ESSENTIAL OILS  
Laura Ramos Rivera  
Institute of Biomaterials, University of Erlangen-Nuremberg, Germany
- 10:00 – 10:20 BIO-TRIBOLOGICAL PROPERTIES AND MICROSTRUCTURE OF  
SEMICRYSTALLINE AL<sub>2</sub>O<sub>3</sub>/PEEK COATINGS ELECTROPHORETICALLY  
DEPOSITED ON THE Ti-13Nb-13Zr ALLOY  
Tomasz Moskalewicz  
AGH University of Science and Technology, Poland
- 10:20 – 10:50 Coffee Break

***SESSION X: EPD OF BIOMATERIALS II***

**Session Chair:** Gregorio Vargas

- 10:50 – 11:10 ELECTROPHORETIC DEPOSITION OF HYDROXYAPATITE NANOPARTICLES  
FROM DIFFERENT ALCOHOLIC SUSPENSIONS: EFFECT OF TRIETHANOLAMINE  
Morteza Farrokhi-Rad  
Azarbaijan Shahid Madani University, Iran
- 11:10 – 11:30 DEVELOPMENT OF MULTILAYER COATINGS CONSISTING OF CHITOSAN/45S5  
BIOGLASS®/LAWSON ON PEEK BASED COMPOSITE COATINGS BY EPD  
Muhammad Atiq Ur Rehman  
Institute of Biomaterials, University of Erlangen-Nuremberg, Germany
- 11:30 – 11:50 EPD OF DOPED NANOSTRUCTURED VITREOUS SILICA COATINGS:  
PROCESSING, ANTIMICROBIAL BIOACTIVITY AND APPLICATIONS  
Guido Falk  
Saarland University, Germany



11:50 – 12:10	ELECTRO MIGRATION OF STIMULI-RESPONSIVE MULTI-COMPARTMENT PARTICLES IN TOPOLOGICALLY COMPLEX ENVIRONMENT Ales Zadrazil University of Chemistry and Technology, Prague, Czech Republic
12:10 – 12:30	OPTIMISATION OF THE ELECTROPHORETIC DEPOSITION PARAMETERS FOR NANO-BIOACTIVE SOL-GEL GLASSES COATINGS ON THE Ti6Al4V ALLOY Jöel Fauré Reims University, France
12:30 – 14:00	Lunch
14:00 – 18:30	<i>Optional excursion</i>
18:30 – 20:15	<b>SESSION XI:</b> Young Persons Poster/Presentation Contest (JECS TRUST SPONSORED) <u>Session Chair:</u> Begona Ferrari
20:15 – 22:00	Dinner
22:00 – 23:00	<i>Social Hour</i>

**Thursday, October 5, 2017**

07:30 – 08:30 Breakfast buffet

***SESSION XII: NOVEL APPLICATIONS I***

**Session chair:** Omer van der Biest

08:30 – 09:00 **Keynote**  
EPD FOR COMPOSITE CATHODE LAYER IN ALL-SOLID-STATE LITHIUM ION BATTERY BASED ON SULFIDE ELECTROLYTE  
Atsunori Matsuda  
Toyohashi University of Technology, Japan

09:00 – 09:20 ELECTROPHORETIC FABRICATION OF LITHIUM ION BATTERY ELECTRODES  
Marianna Uceda  
McGill University, Canada

09:20 – 09:40 ELECTRODEPOSITION OF BLACK OXIDE COATINGS ON ALUMINUM 6061 IN DEEP EUTECTIC SOLVENTS, FOR SOLAR THERMAL COLLECTION APPLICATIONS  
Gregorio Vargas  
Cinvestav-Salttillo, Mexico

09:40 – 10:00 REDUCED GRAPHENE OXIDE HYDROGELS, DEPOSITED IN NICKEL FOAM BY ELECTROPHORETIC DEPOSITION, FOR SUPERCAPACITOR APPLICATIONS: TOWARD HIGH VOLUMETRIC CAPACITANCE  
Viet Hung Pham  
Brookhaven National Laboratory, United States of America

10:00 – 10:20 ELECTROPHORETIC DEPOSITION OF  $\text{SnO}_2$  NANOSTRUCTURED THICK FILMS FOR CO SENSING  
Paula Vilarinho  
University of Aveiro, Portugal

10:20 – 11:00 Coffee break

***SESSION XIII: NOVEL APPLICATIONS II***

**Session Chair:** Atsunori Matsuda

11:00 – 11:30 **Keynote**  
ELECTROPHORETIC DEPOSITION OF FUNCTIONALIZED PHOTOCATALYTIC OXIDE NANOCRYSTALS  
Weidong He  
University of Electronic Science and Technology of China, China

11:30 – 11:50 FABRICATION OF  $\text{SiC}_F/\text{SiC}-\text{ZrB}_2$  COMPOSITES BY A HYBRID PROCESS OF ALTERNATING CURRENT ELECTROPHORETIC DEPOSITION (AC-EPD) AND HOT PRESSING  
Dang-Hyok Yoon  
Yeungnam University, South Korea

11:50 – 12:10 TEXTURED BETA-SIALON:  $\text{Eu}^{2+}$  PHOSPHOR DEPOSITS FABRICATED BY ELECTROPHORETIC DEPOSITION (EPD) PROCESS WITHIN A STRONG MAGNETIC FIELD  
Chenning zhang  
National Institute for Materials Science, Japan

12:10 – 12:30 ELECTROPHORESIS TO IMPROVE CEMENT-STEEL BONDING IN WELL CONSTRUCTION  
Alexandre Lavrov  
SINTEF Petroleum Research, Norway

12:30 – 14:00 Lunch

**SESSION XIV: NOVEL APPLICATIONS III**

14:00 – 14:30 **Keynote**  
NANOTUBE/FIBER MULTI-SCALE HYBRID COMPOSITES USING ELECTROPHORETIC DEPOSITION: PROCESSING, CHARACTERIZATION, AND SMART SENSING APPLICATIONS  
Erik T. Thostenson  
University of Delaware, USA

14:30 – 14:50 REACTIVE LASER SINTERING OF ELECTROPHORETICALLY DEPOSITED  $\text{SnO}_2$  AND  $\text{ZnO}$  NANOPARTICULATE FILMS  
Viktor Mackert  
University of Duisburg-Essen, Germany

16:30 – 17:00 Afternoon Coffee

17:00 – 19:00 **SESSION XV: POSTER SESSION II**

19:30 – 21:00 **Conference Banquet**

21:00 – 22:00 *Social Hour*

**Friday, October 6, 2017**

07:30 – 08:30 Breakfast buffet

**SESSION XVI: EPD INTEGRATING MANUFACTURING TECHNOLOGY**

**Session chair:** Atsunori Matsuda

08:30 – 08:50 SELECTIVE ELECTROPHORETIC DEPOSITION OF NANOSILICA PARTICLES ON THE INNER ELECTRODES OF MULTILAYERED CERAMIC CAPACITOR  
Ryan Corpuz  
MSU-IIT, Philippines

08:50 – 09:10 ELECTROPHORETIC DISPLAYS WITH TUNABLE, ANGLE-INDEPENDENT COLOR  
Elaine Lee  
Lawrence Livermore National Laboratory, USA

09:10 – 09:30 ELECTROPHORETIC DEPOSITION OF NIO/NI CORE-SHELL NANOPARTICLES: EFFECT OF METALLIC NI ON THE ELECTROCHEMICAL RESPONSE OF PSEUDOCAPACITORS.  
Joaquin Yus  
ICV-CSIC, Spain

09:30 – 09:50 ELECTROPHORETIC DEPOSITION OF METAL-PHTHALOCYANINE AS A HIGH-PERFORMANCE ELECTROCATALYST  
Youichi Shimizu  
Kyushu Institute of Technology, Japan

10:00 – 10:30 Coffee break

10:30 – 11:30 **Conclusions** (NEXT EPD CONFERENCE, INDUSTRIAL INVOLVEMENT, SCIENTIFIC NETWORK ON EPD, EUROPEAN PROJECTS, INCREASE PARTICIPATION OF “ELECTROCHEMISTRY COMMUNITY”, EDUCATIONAL MATTERS, ETC.)

12:00 Lunch and departures