

Electrophoretic Deposition VI: Fundamentals and Applications

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Monday, October 2, 2017

07:30 – 08:30 Breakfast buffet

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

SESSION I: FUNDAMENTALS OF EPD PROCESS AND MODELLING

Session chair: Aldo R. Boccaccini

08:45 – 09:15

Keynote

MODELING APPROACHES IN ELECTROPHORETIC DEPOSITION
Brian Giera, Lawrence Livermore National Laboratory, USA

09:15 – 09:45

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

09:45 – 10:15

DYNAMIC MESOSCALE MODEL OF REVERSIBLE ELECTROPHORETIC DEPOSITION
Brian Giera, Lawrence Livermore National Laboratory, USA

10:15 – 11:00

Coffee Break

SESSION II: COATINGS

Session chair: Stephan Barcikowski

11:00 – 11:20

STRUCTURAL COLOR COATING FILMS COMPOSED OF AN AMORPHOUS ARRAY OF SILICA AND CARBON BLACK PARTICLES BY ELECTROPHORETIC DEPOSITION, Kiyofumi Katagiri, Hiroshima University, Japan

11:20 – 11:40

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

11:40 – 12:00

SYNTHESIS AND CHARACTERIZATION OF NANOCOMPOSITES COATING BASED ON INORGANIC OCTAHEDRAL CLUSTER UNITS FABRICATED BY ELECTROPHORETIC DEPOSITION PROCESS.
Fabien Grasset, CNRS, France

12:00 – 14:00

Lunch

14:00 – 17:30

Ad hoc sessions and/or free time

17:30 – 18:00

Afternoon Coffee

18.00 – 19.30

SESSION III: POSTER SESSION I and Social Hour

19:50 – 21:00

Dinner

Tuesday, October 3, 2017

07:30 – 08:30 Breakfast buffet

SESSION IV: NOVEL EXPERIMENTAL TECHNIQUES

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 B₄C/AL CERMETS IN A 3D GEOMETRY
WITH GREATER CURVATURE FOR APPLICATIONS IN ARMOR SYSTEMS.
Andrew Pascall, Lawrence Livermore National Laboratory, USA

09:40 – 10:00 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

10:00 – 10:20 FABRICATION AND CHARACTERIZATION OF TITANIA-NANOSHEET FILM BY
ELECTROPHORETIC DEPOSITION TECHNIQUE
Jun-ichi Hamagami, Kanto Gakuin University, Japan

10:20 – 10:40 UNDERSTANDING THE ORIGINS OF ELECTRICALLY TUNABLE STRUCTURAL
COLOR IN AMORPHOUS COLLOIDAL CRYSTAL DEPOSITS
Scott Bukosky, University of California, Davis, USA

10:40 – 11:00 Coffee Break

SESSION V: CERAMICS AND FUNCTIONAL MATERIALS

Session chair: Paula M. Vilarinho

11:00 – 11:30 **Keynote**
APPLICATION OF ELECTROPHORETIC DEPOSITION FOR SOLID OXIDE FUEL
CELL
Motohide Matsuda, Kumamoto University, Japan

11:30 – 11:50 ELECTROPHORETIC DEPOSITION OF NANOPARTICLES FOR PHOTO-THERMAL
SOLAR RECEPTORS
Guillaume Toquer, ICSM, France

11:50 – 12:10 FORMATION OF CARBON INTERPHASE ON POLYCRYSTALLINE AND
AMORPHOUS SiC FIBERS IN SiC/SiC COMPOSITES BY ELECTROPHORETIC
DEPOSITION
Katsumi Yoshida, Tokyo Tech, Japan

12:10 – 12:30 ENVIRONMENTALLY FRIENDLY PROCESSING OF LEAD FREE SODIUM
POTASSIUM NIOBATE THICK FILMS BY ELECTROPHORETIC DEPOSITION
Paula Vilarinho, University of Aveiro, Portugal

12:30 – 12:50 Discussion: Functional materials by EPD: progress and challenges

Tuesday, October 3, 2017 (continued)

- 13:00 – 14:30 Lunch
- 14:30 – 16:00 *Ad hoc* sessions and/or free time
- 16:00 – 16:30 Afternoon Coffee
- 16:30 – 19:30 ***SESSION VI: OMER VAN DER BIEST SYMPOSIUM***
Session Chair: Aldo R. Boccaccini and Tetsuo Uchikoshi
- 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 Argirusis, 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 NOVEL NANOSTRUCTURES GROWN BY ELECTROPHORETIC DEPOSITION USING SI SUBSTRATES WITH LOW RESISTIVITY
Mónica Tirado, 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
- 19:50 – 21:00 Dinner
- 21:00 – 22:00 *Social Hour* (Sara Restaurant/Coffee shop – Lobby Level)

Wednesday, October 4, 2017

07:30 – 08:30 Breakfast buffet

SESSION VII: EPD OF BIOMATERIALS

Session Chair: Gregorio Vargas

08:30 – 08:50 DEVELOPMENT OF A BIODEGRADABLE NATURAL POLYMER/CERAMIC COATING FOR MG ALLOYS USING ELECTROPHORETIC DEPOSITION
Svenja Heise, Institute of Biomaterials, University of Erlangen-Nuremberg, Germany

08:50 – 09:10 BIO-TRIBOLOGICAL PROPERTIES AND MICROSTRUCTURE OF SEMICRYSTALLINE AL₂O₃/PEEK COATINGS ELECTROPHORETICALLY DEPOSITED ON THE Ti-13Nb-13Zr ALLOY
Tomasz Moskalewicz, AGH University of Science and Technology, Poland

09:10 – 09:30 ELECTROPHORETIC DEPOSITION OF ZEIN/BIOGLASS COMPOSITES WITH INCORPORATION OF ESSENTIAL OILS
Laura Ramos Rivera, Institute of Biomaterials, University of Erlangen-Nuremberg, Germany

09:30 – 09:50 EPD OF DOPED NANOSTRUCTURED VITREOUS SILICA COATINGS: PROCESSING, ANTIMICROBIAL BIOACTIVITY AND APPLICATIONS
Guido Falk, Saarland University, Germany

09:50 – 10:10 ELECTROPHORETIC DEPOSITION OF HYDROXYAPATITE NANOPARTICLES FROM DIFFERENT ALCOHOLIC SUSPENSIONS: EFFECT OF TRIETHANOLAMINE
Morteza Farrokhi-Rad, Azarbaijan Shahid Madani University, Iran

10:10 – 10:30 ELECTROPHORETIC DEPOSITION OF LAWSONE LOADED NANO BIOACTIVE GLASS/CHITOSAN COMPOSITE ON PEEK/BG LAYERS
Muhammad Atiq Ur Rehman, University of Erlangen-Nuremberg, Germany

10:30 – 11:00 Coffee Break

11:00 – 12:30

SESSION VIII:

Young Persons Poster/Presentation Contest (JECS TRUST SPONSORED)

Session Chair: Begoña Ferrari

Influence of substrate morphology on ZnO nanostructures grown by electrophoretic deposition

Omar Alejandro Espindola, Universidad Nacional de Tucumán, Argentina

In-situ USAXS/SAXS Investigation of Tunable Structural Color in Amorphous Photonic Crystals during Electrophoretic Deposition

Scott Bukosky, University of California, Davis, USA

In vitro characterization of a biodegradable chitosan/bioactive glass coating for Mg alloys

Svenja Heise, University Erlangen-Nuremberg, Germany

Antibacterial and bioactive coatings based on electrophoretic deposition of chitosan/bioactive glass/lawsone on PEEK/bioactive glass layers

Muhammad Atiq Ur Rehman, University of Erlangen-Nuremberg, Germany

Effect of surface modifiers on the nanoparticles electro-driven assembly

Joaquin Luis Yus Domínguez, Institute of Ceramic and Glass, CSIC, Spain

Wednesday, October 4, 2017 (continued)

Anisotropic α -Fe₂O₃/Chitosan nanocomposites by electrophoretic deposition
Laura Ramos Rivera, University of Erlangen-Nuremberg, Germany

Fabrication of Octahedral Tantalum Cluster Film by Electrophoretic Deposition
Nguyen Thi Kim Ngan, Hokkaido University, Japan

12:30 – 14:00

Lunch

14:00 – 18:30

Optional excursion

19:50 – 21:00

Dinner

21:00 – 22:00

Social Hour (Sara Restaurant/Coffee shop – Lobby Level)

Thursday, October 5, 2017

07:30 – 08:30 Breakfast buffet

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

09:20 – 09:40 REDUCED GRAPHENE OXIDE HYDROGELS, DEPOSITED IN NICKEL FOAM BY ELECTROPHORETIC DEPOSITION, FOR SUPERCAPACITOR APPLICATIONS: TOWARD HIGH VOLUMETRIC CAPACITANCE
James Dickerson, Brookhaven National Laboratory, United States of America

09:40 – 10:00 ELECTROPHORETIC DEPOSITION OF SnO_2 NANOSTRUCTURED THICK FILMS FOR CO SENSING
Paula Vilarinho, University of Aveiro, Portugal

10:00 – 10:20 Discussion: EPD in novel applications: progress and challenges

10:20 – 11:00 Coffee break

SESSION XIII: NOVEL APPLICATIONS II

Session Chair: Atsunori Matsuda

11:00 – 11:30 **Keynote**
NANOTUBE/FIBER MULTI-SCALE HYBRID COMPOSITES USING ELECTROPHORETIC DEPOSITION: PROCESSING, CHARACTERIZATION, AND SMART SENSING APPLICATIONS
Erik T. Thostenson, University of Delaware, USA

11.30- 11:50 FABRICATION OF SiCf/SiC-ZrB_2 COMPOSITES BY A HYBRID PROCESS OF ALTERNATING CURRENT ELECTROPHORETIC DEPOSITION (AC-EPD) AND HOT PRESSING
Kati Raju, Energy Materials Research Division, Korea Institute of Energy Research, South Korea

11:50 – 12:20 **Keynote**
COLLOIDAL ADDITIVE MANUFACTURING USING PROJECTION BASED LIGHT DIRECTED ELECTROPHORETIC DEPOSITION
Andrew Pascall, Lawrence Livermore National Laboratory, USA

12:20 – 14:00 Lunch

14:00 – 17:30 *Ad hoc* sessions and/or free time

17.30 – 19.00 ***SESSION XV: POSTER SESSION II and Social Hour***

19:30 – 21:30 **Conference Banquet** (Emerald and Ruby Hall)

Friday, October 6, 2017

07:30 – 08:30 Breakfast buffet

SESSION XVI: EPD INTEGRATING MANUFACTURING TECHNOLOGY

Session chair: Guido Falk

08:30 – 08:50 ELECTROPHORETIC DISPLAYS WITH TUNABLE, ANGLE-INDEPENDENT COLOR
Elaine Lee, Lawrence Livermore National Laboratory, USA

08:50 – 09:10 ELECTROPHORETIC DEPOSITION OF METAL-PHTHALOCYANINE AS A HIGH-
PERFORMANCE ELECTROCATALYST
Youichi Shimizu, Kyushu Institute of Technology, Japan

09:10 – 10:00 Discussion: EPD in Industrial Applications: Challenges

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

Poster Presentations

1. **Electrophoretic deposition of carbon nanotubes on carbon fibers**
Christos Argiris, National Technical University of Athens, Greece
2. **Electrophoretic deposition of Ag nanoparticles into TiO₂ nanotube arrays and their performance as photoanode of dye-sensitized solar cells**
Go Kawamura, Toyohashi University of Technology, Japan
3. **Fabrication of octahedral tantalum cluster film by electrophoretic deposition**
Ngan T.K Nguyen, National Institute for Materials Science, Japan
4. **Electrophoretic deposition of cellulose nanofibers in aqueous suspensions**
Tomohiko Yoshioka, Okayama University, Japan
5. **Preparation of BaTiO₃ nanotube arrays, CoFe₂O₄ nanoparticles and their composite**
Wai Kian Tan, Toyohashi University of Technology, Japan
6. **Anisotropic α -Fe₂O₃/chitosan Nanocomposites by electrophoretic deposition**
Laura Ramos Rivera, FAU Erlangen-Nuremberg, Germany
7. **Seed layers for the growth of oriented vertical arrays of ZnO nanorods**
Ondřej Černohorský, Institute of Photonics and Electronics, AS CR, v.v.i., Czech Republic
8. **Investigation of affecting parameters of Electrophoretic deposition (EPD) method in (Bi_{0.5}Na_{0.5})TiO₃-Hexagonal BaTiO₃ and their properties**
Minsu Kim, University of Yamanashi, Japan
9. **Influence of substrate morphology on ZnO nanostructures grown by electrophoretic deposition**
Omar Alejandro Espindola, Universidad Nacional de Tucumán, Argentina
10. **In-Situ USAXS/SAXS investigation of tunable structural color in amorphous photonic crystals during electrophoretic deposition**
Scott Bukosky, Lawrence Livermore National Laboratory, USA
11. **In vitro characterization of a biodegradable chitosan/bioactive glass coating for Mg alloys**
Svenja Heise, Friedrich-Alexander University Erlangen-Nuremberg, Germany
12. **Antibacterial and bioactive coatings based on electrophoretic deposition of chitosan/bioactive glass/lawsone on PEEK/bioactive glass layers**
Muhammad Atiq Ur Rehman, University of Erlangen-Nuremberg, Germany
13. **Effect of surface modifiers on the nanoparticles electro-driven assembly**
Joaquin Luis Yus Domínguez, ICV-CSIC, Spain