

Atomic Layer Infiltration and Deposition for Functional Hybrid Materials 2023 Workshop

10-13 September 2023 | Technion, Haifa, Israel

Posters

1. Alloy Nanowire Arrays with Controlled Compositions Templated by Block Copolymers | *Ofer Burg, Hebrew University of Jerusalem*
2. Photocatalytic Enantiomeric Enrichment of Racemic Drug Mixtures using ALD-Assisted Chiral Molecular Imprinting | *Lital Felzenshtein, Technion – Israel Institute of Technology*
3. Protective Thin Film Coating by ALD to Enhance Corrosion Resistivity of Current Collectors in Rechargeable Magnesium Batteries | *Ananya Maddegalla, Bar-Ilan University*
4. Modifying the Properties and Performance of Biodegradable Polymers with Atomic Layer Deposition | *Gil Menasherov, Technion – Israel Institute of Technology*
5. High Entropy: An Emerging Prospect for Design of Na-Ion Battery Cathode | *Akanksha Joshi, Bar-Ilan University*
6. How Low Can We go? Enhancing Polymer Films Resistance to Solvents with SIS by Modifying the Concentrations of the Reactive Functional Groups | *Gilad Sasson, Technion – Israel Institute of Technology*
7. Applications with Bio-Based Green Material using Vapor Phase Infiltration | *Seiji Morita, Wisdom Pool Research Institute G.K.*
8. Binder-free tandem MLD/ALD treated Si-Ti layered oxides thin films on CNT mat for Flexible and Ultra-Stable Pseudocapacitor | *Ankit Yadav, Hebrew University of Jerusalem*
9. Atomic Layer Deposition of AlF_3-ZrO_2 on Ni-Rich $LiNi_{0.8}Co_{0.1}Mn_{0.1}O_2$ Cathode for Improved Electrochemical Performance in Lithium-Ion Batteries | *Bagavathi Muniyandi, Bar Ilan University*
10. Sequential Infiltration Synthesis for Organized Nanostructure Fabrication | *Gabriele Seguni, IMM-CNR*



tdc@tzamal-medical.co.il | 073-7151137/8.70



Atomic layer Infiltration and Deposition for Functional Hybrid Materials

2023 Workshop

Sunday, 10.9.23 – Tutorial

- 11:30 – 12:00 **Tutorial registration & light lunch**
- Tutorial chair:** *Eran Edri, Ben-Gurion University*
- 12:00 – 13:15 **Basics of vapor-phase materials deposition and introduction to atomic layer deposition** | *Chang Yong Nam, Brookhaven National Laboratory*
- 13:15 – 13:45 **Coffee Break**
- 13:45 – 15:00 **Evolution of Vapor Phase Processing (VPI) as the fourth pillar of Atomic Layer Processing** | *Mato Knez, CIC nanoGUNE*
- 15:00 – 15:15 **Coffee Break**
- 15:15 – 16:30 **Atomic and Molecular Layer Deposition on Particulate Materials** | *Malachi Noked, Bar Ilan University*

Sunday, 10.9.23 - Workshop opening

- 16:30-18:30 **Registration**
- 18:30 **Reception dinner**

Monday, 11.9.23

Fundamentals of Materials Hybridization via VPI, SIS, ALD, and MLD

- 08:30 – 09:15 **Gathering + coffee**
- 09:15 – 09:30 **Opening remarks** | *Tamar Segal-Peretz, Technion – Israel Institute of Technology*
- Session chair:** *Tamar Segal-Peretz, Technion – Israel Institute of Technology*
- 09:30 – 10:00 **Lessons From Nature: How to Get the Best out of Materials** (Invited) | *Mato Knez, CIC nanoGUNE*
- 10:00 – 10:15 **On the Development and Atomic Structure of ZnO Nanoparticles Grown within Polymers using Sequential Infiltration Synthesis** | *Inbal Weisbord, Technion – Israel Institute of Technology*
- 10:15 – 10:30 **Understanding the Chemical Structure of PIM-1/Metal Oxide Hybrid Membranes Synthesized via Vapor Phase Infiltration to Achieve New Properties** | *Benjamin Jean, Georgia Institute of Technology*
- 10:30 – 10:45 **Sequential Infiltration Synthesis of Al₂O₃ in Bio-Based Polymers: A Physico-Chemical Investigation** | *Alessia Motta, CNR-IMM*
- 10:45 – 11:15 **Coffee Break**
- Session chair:** *Michele Perego, CNR-IMM*
- 11:15 – 11:45 **Sequential Infiltration at Its Earliest Stages: Cluster Structure, Coalescence, and Conductivity** (Invited) | *Alex Martinson, Argonne National Laboratory*
- 11:45 – 12:00 **Imaging the Bulk Heterojunction Morphology in Organic Solar Cells Using VPI Selective Staining** | *Sasha Simotko, Technion – Israel Institute of Technology*
- 12:00 – 12:30 **Poster flash talks**
- 12:30 – 12:40 **Group Photo**
- 12:40 – 14:00 **Lunch**
- 14:00 – 15:00 **Poster session**
- Session chair:** *Gabriele Segolini, CNR-IMM*
- 15:00 – 15:30 **Unravelling Process Chemistries at the Atomic Level: Simulation of Molecular Layer Deposition and Vapour Phase Infiltration** (Invited) | *Michael Nolan, University College Cork*
- 15:30 – 15:45 **Molecular Layer Deposition of Alucone Thin Film on LiCoO₂ to Enable High Voltage Operation** | *Ortal Shalev, Bar-Ilan University*
- 15:45 – 16:00 **Vapor Phase Deposition of Chiral Thin Films by Atomic and Molecular Layer Deposition Showing Spin Selective Transport** | *Salma Khalde, Hebrew University of Jerusalem*
- 16:00 – 16:30 **Coffee Break**
- 16:30 – 18:00 **Cable car to the University of Haifa and a lookout on the Haifa Bay**

Atomic layer Infiltration and Deposition for Functional Hybrid Materials

2023 Workshop

Tuesday, 12.9.23

Functional Properties and Applications

08:30 – 09:00 *Gathering + coffee*

Session chair: *Chang-Yong Nam, Brookhaven National Laboratory*

09:00 – 09:30 **Free and Simple Simulations of Vapor-Phase Infiltration Process Kinetics Using Google Colab** (Invited) |
Mark Losego, Georgia Institute of Technology

09:30 – 09:45 **Biomimetic Selectively Antibacterial and Biocompatible Metallochitin Films by Vapor Phase Chemistry** |
Karina Ashurbekova, CIC nanoGUNE

09:45 – 10:00 **The Effect of Water Uptake on the Mechanical Behavior of Hybrid Thin Films Fabricated by Sequential Infiltration Synthesis** | *Shachar Keren, Technion – Israel Institute of Technology*

10:00 – 10:30 **Hybrid Functional Materials by Atomic and Molecular Layer Deposition - Chemistry and Selected Applications** (Invited) | *Roie Yerushalmi, Hebrew University of Jerusalem*

10:30 – 11:00 *Coffee Break*

Session chair: *Eran Edri, Ben-Gurion University*

11:00 – 11:30 **Chemical Vapor Functionalization of Polymer Membranes for Water Treatment** (Invited) |
Jeffrey Elam, Argonne National Laboratory

11:30 – 11:45 **Modification of Reverse Osmosis Membranes with Phosphate-Sorbed Alucone to Mitigate Ozone Damage** |
Leilah Krounbi, Ben Gurion University

11:45 – 12:00 **Multifunctional Textiles upon Vapor Phase Infiltration (VPI) of Metal Oxides into Denim Jeans** |
Natalia Chamorro Garcia, CIC nanoGUNE

12:00 – 13:00 *Lunch*

13:00 – 13:30 **Tour to Technion Energy Program Labs**

13:30 – 14:00 **Poster session**

Session chair: *Tamar Segal-Peretz, Technion – Israel Institute of Technology*

14:00 – 14:30 **Application of Vapor-Phase Infiltration for Energy-Efficient, Extremely Downscaled Semiconductor Devices** (Invited) | *Chang-Yong Nam, Brookhaven National Laboratory*

14:30 – 14:45 **Rational Design and Fabrication of Block Copolymer Templated Hafnium Oxide Nanostructure** |
Ruoke Cai, Technion – Israel Institute of Technology

14:45 - 15:00 **Hybrid Metrology for Infiltrated Optical Metasurfaces** | *Irdi Murataj, Istituto Nazionale di Ricerca Metrologica (INRiM)*

15:00 – 20:00 *Social activity – tour to old Acre & dinner*

Atomic layer Infiltration and Deposition for Functional Hybrid Materials

2023 Workshop

Wednesday, 13.9.23

Molecular Understanding and Macroscopic Behaviors

08:30 – 09:00 **Gathering + coffee**

Session chair: *Gabriele Seguni, CNR-IMM*

09:00 – 09:30 **Fundamental Physical and Chemical Phenomena Occurring during Sequential Infiltration Synthesis: In-Situ Real Time Monitoring by Spectroscopic Ellipsometry (Invited) | Michele Perego, CNR-IMM**

09:30 – 09:45 **Enantioselective Photocatalysis: A Novel Method for Enantiomeric Enrichment via Chiral Imprinting and Activity Damping Using ALD | Nitai Arbely, Technion – Israel Institute of Technology**

09:45 – 10:15 **Sequential Infiltration Synthesis of Ru metal and RuO₂ (Invited) | Jolien Dendooven, Ghent University**

10:15 – 10:45 **Coffee Break**

Session chair: *Michele Perego, CNR-IMM*

10:45 – 11:15 **In-Situ MCP-Calorimetry Probe for ALD and its Derivative Process such as ALE/MLD/SIS (Invited) | Anil Mane, Argonne National Laboratory**

11:15 – 11:30 **Next Generation Complex Ceramic Nanowires Fabrication | Rotem Azoulay, Technion – Israel Institute of Technology**

11:30 – 11:45 **Organic-Inorganic Hybrid Thermoelectric Materials through a New Concept of Vapor Phase Infiltration | Kristina Ashurbekova, CIC nanoGUNE**

11:45 – 12:00 **Universal Platform for Photothermal-Induced Substrate's Temperature Influence in Sequential Infiltration Synthesis of a Block Copolymer Template | Przemyslaw Pula, University of Warsaw**

12:00 – 13:30 **Lunch**

Session chair: *Chang-Yong Nam, Brookhaven National Laboratory*

13:30 – 14:00 **Suppression of Electrode Material Degradation by Surface Modifications Techniques (Invited) | Malachi Noked, Bar-Ilan University**

14:00 – 14:15 **Cost-Effective High-Energy LiNiO₂-Based All-Solid-State Lithium Batteries Enabled by Ultrathin Atomic Layer Deposition Protection | Longlong Wang, University of Oxford**

14:15 – 14:30 **Improved Electrochemical Performance of TiO₂ Coated NVPFO_{2x(0<x<1)}: Synergistic Effect of 3rd Na Activation and Artificial CEI Layer Formation by ALD Method | Sankalpita Chakrabarty, Bar Ilan University**

14:30 – 15:00 **Coffee break**

Session chair: *Eran Edri, Ben-Gurion University*

15:00 – 15:15 **Optimizing Accessibility in Ultra-High Ratio Carbon Sponges | Lev Rovinsky, Tel Aviv University**

15:15 – 15:30 **Multicomponent RuAlO_x and RuTiO_x Thin Films through Atomic Layer Modulation | Ngoc Le Trinh, Chi Thang Nguyen, Bonwook Gu, Byungchan Lee, Sehee Kim, Yeseul Son, Taehoon Cheon, Bonggeun Shong, Soo-Hyun Kim, Han-Bo-Ram Lee, Incheon National University**

15:30 – 16:00 **Closing remarks and poster awards**



tdc@tzamal-medical.co.il | 073-7151137/8.70

