

The 16th Israel Materials Engineering Conference

IMEC2014**16**



PROGRAM

23-25 בפברואר, 2014, טכניון, חיפה
February 23-25, 2014, Technion, Haifa

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Dear Colleagues,

On behalf of the Organizing Committee, it is our pleasure to welcome you to the 16th Israel Materials Engineering Conference (**IMEC-16**) held on February 23-25, 2014 at the Technion, Haifa.

IMEC-16 is following the tradition of IMEC conferences, and is serving as a meeting point for scientists and engineers from academia, research institutes and Israeli industry to exchange information and consolidate joint research programs. IMEC-16 includes all aspects of Materials Science and Engineering. The conference is representing the accelerated progress of materials science worldwide and in Israel in recent years.

IMEC-16 2 days (Feb. 24-25) program includes 4 plenary presentations, keynote and invited lectures from leading scientists in Israel and abroad on emerging topics of research in Materials Science and Engineering. The two conference days will hold 5 parallel sessions, subsequent to a pre-conference event on Feb. 23rd, holding 7 tutorial talks by leading technology personnel. A large commercial exhibition, with more than 25 exhibitors from leading companies in Israel and abroad will be displayed. The traditional conference banquet will be held on Monday evening.

Looking forward to a successful event,

Professor Yair Ein-Eli
Chairman IMEC-16

Committees

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Pre-conference Program (Auditorium 280, 2nd Flr.)

Sunday, February 23, 2014

Chair: Y. Ein Eli, *Technion-Israel Institute of Technology*

13:00 - 13:15	OPENING - Y. Ein Eli
13:15 - 15:15	Session Chair: Y. Roisin, TowerJazz
13:15 - 13:45	Atom Probe Tomography for Advanced Materials Francois Horreard, CAMECA SAS, France
13:45 - 14:15	Advanced Analytical Microscopy in Multiple Dimensions Dong Tang, FEI, The Netherlands
14:15 - 14:45	Fibers and Mats Based on Extremely Long CNT Yehoshua Yeshurun, Plasan, Israel
14:45 - 15:15	Research Funding: Tips for Writing a Successful Application David Shem-Tov, Deloitte Brightman Almagor Zohar, Israel
15:15 - 15:45	COFFEE BREAK
15:45 - 17:15	Session Chair: Y. Yeshurun, Plasan
15:45 - 16:15	Semiconductor Future Challenges Ami Appelbaum, KLA Tencor, Israel
16:15 - 16:45	2.5D/3D Integration Solutions in Modern Semiconductor Electronics Yakov Roizin, TowerJazz, Israel
16:45 - 17:15	Inert Gas Technologies in OLED and Lithium Battery Research, Development and Production Mike Boutin, MBraun USA
17:15 - 17:30	CLOSING - Y. Ein Eli



Monday, February 24, 2014

08:00-09:00	Registration and Refreshments				
09:00-09:30	Opening Session (Auditorium 280, 2nd Flr.)				
09:30-10:15	Plenary I (Auditorium 280, 2nd Flr.)				
10:15-11:00	Coffee Break (Foyer) & Poster Session (3rd Flr.)				
	(Auditorium 280, 2nd Flr.)	(Room 165, 1st Flr.)	(Room 815, 8th Flr.)	(Auditorium 1003, 10th Flr.)	(Room 351, 3rd Flr.)
11:00-13:00	Materials for Energy I	Nano Materials & Nano Technology I	Materials in Biology and Medicine I	Advanced Materials Characterizations Techniques I	Mechanical Behavior of Materials
13:00-14:30	Lunch (Olive Trees Garden-Russel Berrie Promenade) & Poster Session (3rd Flr.)				
14:30-15:15	Plenary II (Auditorium 280, 2nd Flr.)				
15:15-15:30	Break				
15:30-17:40	Materials for Energy II	Nano Materials & Nano Technology II	Materials in Biology and Medicine II	Advanced Materials Characterizations Techniques II	Physical Metallurgy
20:00-22:00	Gala Dinner at "Bikta Baya'ar", Beit Oren (Optional)				

Tuesday, February 25, 2014

07:45-08:30	Registration and Refreshments				
08:30-09:15	Plenary III (Auditorium 280, 2nd Flr.)				
09:15-10:00	Plenary IV (Auditorium 280, 2nd Flr.)				
10:00-11:00	Coffee Break (Foyer) & Poster Session (3rd Flr.)				
	(Auditorium 280, 2nd Flr.)	(Room 165, 1st Flr.)	(Room 815, 8th Flr.)	(Auditorium 1003, 10th Flr.)	(Room 351, 3rd Flr.)
11:00-13:00	Electronic Materials and Thin Films	Polymers and Colloids	Computational Materials I	Physics & Chemistry of Materials	Corrosion, Surface Treatments and Coatings
13:00-14:00	Lunch (Olive Trees Garden-Russel Berrie Promenade)				
14:00-15:00	Poster Session (3rd Flr.)				
15:00-17:00	Semiconductors & Electronic Materials	Thermoelectric & Metallurgical Materials	Computational Materials II - Energy	Ceramic Materials, Processing & Forming of Materials	
17:00-17:30	Closing Session (Auditorium 280, 2nd Flr.)				

PROGRAM

Monday, February 24, 2014

09:00-09:30 Opening Session (Auditorium 280, 2nd Flr.)

Chair: Y. Ein-Eli, *Department of Material Science and Engineering, Technion-Israel Institute of Technology*

Greetings by:

P. Lavie, *President, Technion-Israel Institute of Technology*

W. Kaplan, *Dean, Department of Material Science and Engineering, Technion-Israel Institute of Technology*

D. Shechtman, *Nobel Laureate, Department of Material Science and Engineering*

09:30-10:15 Plenary I (Auditorium 280, 2nd Flr.)

Chair: Y. Ein-Eli, *Technion-Israel Institute of Technology*

09:30 On the Challenges in Energy Storage and Conversion That We Face Today

Doron Aurbach, *Department of Chemistry, Bar-Ilan University, Israel*

10:15-11:00 Coffee Break (Foyer) & Poster Session* (3rd Flr.)

11:00-13:00 Materials for Energy I (Auditorium 280, 2nd Flr.)

Chairs: D. Nessim, *Bar-Ilan University* and D. Jacob, *IsraZion Ltd*

11:00 KEYNOTE - Advanced In-situ Characterization of Interfaces and Devices with Relevance to Energy Storage

Daniel Scherson, *Department of Chemistry, Case Western Reserve University, USA*

11:25 INVITED - To Order, or not To Order: The Choice of Strategy for the Preparation of Solid Polymer Electrolytes with High Conductance

Diana Golodnitsky, Keren Shvartsman, Raymond Blanga, Emanuel Peled
School of Chemistry, Tel-Aviv University, Israel

11:45 Distinct View on Batteries Performance Analysis

Moran Balaish¹, Alexander Kraysberg², Yair Ein-Eli²

¹The Nancy and Stephen Grand Technion Energy Program (GTEP), *Technion- Israel Institute of Technology, Israel*

²Department of Materials Science and Engineering, *Technion-Israel Institute of Technology, Israel*

12:00 Novel 3D Electrodeposited Tin Nano Structured Electrodes for Methanol Anodes in Fuel Cells

Hanan Teller, Olga Krichevski, Shani Ohanona, Alex Schechter
Department of Biological Chemistry, Ariel University, Israel

*See list on pages 27-38

12:15 Effect of Silver Nanoparticle Size on Ionic Liquid Mediated Artificial Photosynthesis

Brian Rosen^{1,3}, Amin Salehi-Khojin¹, Molly Jhong¹, Wei Zhu², Sichao Ma¹, Paul Kenis¹, Richard Masel²

¹*Chemical and Biomolecular Engineering, University of Illinois at Urbana-Champaign, USA*

²*Dioxide Materials, Inc., USA*

³*Department of Materials Science and Engineering, Tel-Aviv University, Israel*

12:30 External Recycling of Photon Emission in Ultra-Efficient Photovoltaics: Challenges for Nanotechnology

Eugene Katz^{1,2}, Avi Braun¹, Daniel Feuermann¹, Brendan Kayes³, Jeffrey Gordon^{1,4}

¹*Department of Solar Energy and Environmental Physics, Jacob Blaustein Institutes for Desert Research, Ben-Gurion University of the Negev, Israel*

²*The Ilse Katz Institute for Nanoscale Science and Technology, Ben-Gurion University of the Negev, Israel*

³*Alta Devices Inc, Alta Devices Inc, USA*

⁴*The Pearlstone Center for Aeronautical Engineering Studies, Department of Mechanical Engineering, Ben-Gurion University of the Negev, Israel*

12:45 Oxide Absorber Materials for All-Oxide Photovoltaics

Koushik Majhi, A. Anderson, H-N Barad, Y. Bouhadana, E. Rosh-Hodesh, A. Ginsburg, D. Keller, S. Rühle, K. Shimanovich, A. Zaban

Institute for Nanotechnology & Advanced Materials, Bar-Ilan University, Israel

11:00-13:00 Nano Materials & Nano Technology I (Room 165, 1st Flr.)

Chairs: U. Banin, *The Hebrew University of Jerusalem* and **E. Joselevich**, *Weizmann Institute of Science*

11:00 KEYNOTE - Oxide Surfaces and Nanoparticles: From Surface to Catalysis

Laurence Marks

Department of Materials Science & Engineering, Northwestern University, USA

11:25 INVITED - Hollow Octahedral Nanocrystals for Electrocatalysis

Meital Shviro, Shlomi Polani, **David Zitoun**

Department of Chemistry and Bar-Ilan Institute of Nanotechnology and Advanced Materials (BINA), Bar-Ilan University, Israel

11:45 Spatially Resolved Doping Profiles of *p-i-n* Junctions in VLS-Grown Nanowires

Iddo Amit¹, Nari Jeon², Lincoln J. Lauhon², Yossi Rosenwaks¹

¹*School of Electrical Engineering, Department of Physical Electronics, Tel-Aviv University, Israel*

²*Department of Materials Science and Engineering, Northwestern University, USA*

12:00 Growth of Metal Nanotubes

Semanur Baylan¹, Eugen Rabkin², Gunther Richter¹

¹*Thin Films, Max Planck Institute for Intelligent Systems, Germany*

²*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

12:15 Guided Growth of Epitaxially Coherent GaN Nanowires on SiC

David Tsivion¹, Ronit Popovitz-Biro², Ernesto Joselevich¹

¹*Materials and Interfaces, Weizmann Institute of Science, Israel*

²*Chemical Research Support, Weizmann Institute of Science, Israel*

12:30 Wetting - Like Interaction Between Nanoscale Metals: How Solid They Are?

Inna Popov¹, Michael Groushko², Polina Roitman², Haibin Su³, Xi Zhu³, Alexander Kamysny², Shlomo Magdassi^{1,2}

¹*The Center for Nanoscience and Nanotechnology, The Hebrew University of Jerusalem, Israel*

²*Casali Institute of Applied Chemistry, The Hebrew University of Jerusalem, Israel*

³*School of Materials Science and Engineering, Nanyang Technological University, Singapore*

12:45 Effect of Plasmonic Field on Optical Properties of Semiconducting Nanocrystals

Gary Zaiats¹, Jenya Tichlin¹, Inbal Heseg¹, Efrat Lifshitz¹, Carmel Rotschild², Nimrod Kruger²

¹*Department of Chemistry, Technion-Israel Institute of Technology, Israel*

²*Department of Mechanical Engineering, Technion-Israel Institute of Technology, Israel*

11:00-13:00 Materials in Biology and Medicine I (Room 815, 8th Flr.)

Chairs: N. Ashkenasy, Ben-Gurion University of the Negev and A. Sosnik, Technion-Israel Institute of Technology

11:00 KEYNOTE - Bio-Inspired Routes for Controlling the Structure and Properties of Materials: Reusing Proven Tricks on New Materials

Boaz Pokroy, Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

11:25 INVITED - Dynamics, Structure, and Interactions Between Self-Assembled Biomolecules

Uri Raviv, The Institute of Chemistry, The Hebrew University of Jerusalem, Israel

11:45 From the Microstructure to the Atomic Structure of Biogenic Vaterite

Lee Amiati^{1,2}, Boaz Pokroy^{1,2}, Yaron Kauffmann¹

¹*Department of Materials Science and Material Engineering, Technion-Israel Institute of Technology, Israel*

²*Russell Berrie Nanotechnology Institute, Technion-Israel Institute of Technology, Israel*

**12:00 Shape Memory Effects in Electrospun Nanofibers Mats:
Experimental Investigation and Application to Controlled Drug Delivery**

Charly Azra, Dimitry Alhazov, Ron Avrahami, Eyal Zussman

NanoEngineering Group, Faculty of Mechanical Engineering, Technion-Israel Institute of Technology, Israel

12:15 Mesoporous Silicon Nanovectors for Primary Tumors and Liver Metastasis

Biana Godin, *Department of Nanomedicine, Houston Methodist Research Institute, USA*

**12:30 In-Vitro Behavior of Rapidly Solidified Biodegradable Magnesium Alloy
EW62**

Orly Hakimi, Eli Aghion, *Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

**12:45 The Impact of Biotechnologically Produced Biomineralization-Fusion
Proteins on the Crystal Structure of Calcium Carbonate**

Eva Weber¹, Leonid Bloch¹, Christina Guth², Ingrid M. Weiss², Boaz Pokroy¹

¹*Department of Materials Engineering and the Russell Berrie Nanotechnology Institute, Technion- Israel Institute of Technology, Israel*

²*Program Division Biomineralization, INM - Leibniz Institute for New Materials, Germany*

11:00-13:00 Advanced Materials Characterizations Techniques I

(Auditorium 1003, 10th Flr.)

Chairs: S. Berger, *Technion-Israel Institute of Technology* and **M. Aizenstein**, *NRC-Negev*

11:00 KEYNOTE - Microcantilever Testing of Ceramics and Nanocomposites

R.I. Todd, A. Norton, N.A. Yahya, X. Sun, S. Falco, N. Petrinic, G. Hughes

Department of Materials, University of Oxford, UK

**11:25 INVITED - Full Structure Solution of Intermetallic Compounds Using Solely
Electron Diffraction Data**

Louisa Meshi^{1,2}, Shmuel Samuha

¹*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

²*Ilse Katz Institute for Nanoscale Science and Technology, Ben-Gurion University of the Negev, Israel*

11:45 The Slow Positron Facility (SPOT) in Israel

Sharon May-Tal Beck¹, Dan Cohen², Erez Cohen³, Meital Duer³, Jonathan Dumas², Or Hen³, Aidan Kelleher², Eli Piasetzky³, Nikolay Pilip³, Guy Ron², Iriss Sabo-Napadensky⁴, Ruth Weiss-Babai⁴

¹*Department of Physics, NRCN, Israel*

²*Racah Institute of Physics, The Hebrew University of Jerusalem, Israel*

³*School of Physics and Astronomy, Tel-Aviv University, Israel*

⁴*Department of NDT, Soreq NRC, Israel*

12:00 Characterization of NiTi Shape-Memory Alloys Processed by Warm Working

Yuri Khoptiar, Royi Padan, Joseph Flomenblit, Itamar Gutman, David Gorni
Advanced Materials Department, R&D and Technologies Center, Manor Division, Rafael - Advanced Defense Systems Ltd., Israel

12:15 Quantitative Dopant Mapping in Silicon Nanostructures by Off-Axis Electron Holography

Adi Pantzer^{1,2}, Atsmon Vakahy², Dror Horvitz², Zohar Eliyahou¹, Roie Yerushalmi³, Amit Kohn¹

¹*Department of Materials Engineering and Ilse Katz Institute for Nanoscale Science and Technology, Ben-Gurion University of the Negev, Israel*

²*Yield, Micron Semiconductors Israel Ltd., Israel*

³*Institute of Chemistry and the Center for Nanoscience and Nanotechnology, The Hebrew University of Jerusalem, Edmond J. Safra Campus, Israel*

12:30 The Molecular Details of Small Amino Acids Binding Specificity to Amorphous Silica Surfaces Determined by Solid State NMR

Ira Ben Shir, Shifi Kababya, Asher Schmidt
Schulich Faculty of Chemistry and Russell Berrie Nanotechnology Institute, Technion - Israel Institute of Technology, Israel

12:45 Gaining Deeper Insights Into Thin Film Response - Overcoming Spectral Oscillations of Total Losses (1-R-T)

Jan Wuelfken¹, Travis Burt², Robert J. Francis², Michael K. Trubetskov³, Tatiana V. Amotchkina³

¹*CAG, Agilent Technologies, Germany*

²*Australia, Agilent Technologies, Australia*

³*Research Computing Center, Moscow State University, Russia*

11:00-13:00 Mechanical Behavior of Materials (Room 351, 3rd Flr.)

Chairs: I. Lubomirsky, Weizmann Institute of Science and D. Sherman, Technion-Israel Institute of Technology

11:00 KEYNOTE - Microstructural Aspects of Dynamic Shear Localization

Daniel Rittel, Osovski Shmuel, Arie Venkert, Peri Landau
Department of Mechanical Engineering, Technion-Israel Institute of Technology, Israel

11:25 INVITED - Interfacial Strength and Toughness of Nanocomposites from a Pull-Out Mechanism

H. Daniel Wagner, *Department of Materials & Interfaces, Weizmann Institute of Science, Israel*

11:45 High-Stress Properties of Gd-Doped Ceria Thin Films for Electromechanical Applications

Roman Korobko, Igor Lubomirsky

Department of Materials & Interfaces, Weizmann Institute of Science, Israel

12:00 Dopants Initiate Fracture Surface Instabilities in Brittle Crystals

Liron Ben-Bashat Bergman, Dov Sherman

Department of Materials and Science Engineering, Technion-Israel Institute of Technology, Israel

12:15 Forensic Failure Analysis of Composite Materials: Challenges and Solutions

Tzipora Nusbaum^{1,2}, Konstantin Tartakovsky¹

¹*Department of Science and Material Engineering, Israeli Air Force, Israel*

²*Department of Materials and Nanotechnologies, University of Tel-Aviv, Israel*

12:30 Tabulated Johnson-Cook Plasticity and Ductile Failure Model

Amos Gilat, Jeremy Seidt

Department of Mechanical and Aerospace Engineering, The Ohio State University, USA

12:45 Activation Energy of Crack Growth and Mechanism of Liquid Metal Embrittlement

Evgeny Glickman, *Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

13:00-14:30 Lunch (*Olive Trees Garden-Russel Berrie Promenade*) & **Poster Session*** (3rd Flr.)

14:30-15:15 Plenary II (Auditorium 280, 2nd Flr.)

Chair: A. Rothschild, *Technion-Israel Institute of Technology*

14:30 Mesoscopic Materials for the Conversion of Sunlight to Electricity and Fuels

Michael Graetzel, *Laboratory of Photonics and Interfaces, Ecole Polytechnique Federale de Lausanne, Switzerland*

15:15-15:30 Break

*See list on pages 27-38

15:30-17:35 Materials for Energy II (Auditorium 280, 2nd Flr.)

Chairs: D. Golodnitsky, Tel-Aviv University and Doron Aurbach, Bar-Ilan University

15:30 KEYNOTE - Defect Structure - Property Relationships in Aliovalently-Doped Cathode Materials for Lithium-Ion Batteries - Improved Power Density and Mechanisms of Cyclic Aging

Ruediger A. Eichel, Institute for Energy and Climate Research (IEK), Julich Aachen University, Germany

15:55 INVITED - Synthesis of Carbon Nanostructures: Science and Applications to Energy Devices

Daniel Nessim, Department of Chemistry / Nanotechnology, Bar-Ilan University, Israel

16:15 How Do $\text{CH}_3\text{NH}_3\text{PbI}_{3-x}\text{Cl}_x$ Perovskite Solar Cells Work?

Eran Edri¹, Saar Kirmayer¹, Sabyasachi Mukhopadhyay¹, Konstantin Gartsman², Gary Hodes¹, David Cahen¹

¹Department of Materials & Interfaces, Weizmann Institute of Science, Israel

²Chemical Research Support, Weizmann Institute of Science, Israel

16:30 Bi-Metallic Co-catalysts for Studying Photocatalytic Hydrogen Production

Philip Kalisman¹, Lilac Amirav¹, Eran Aronovitch², Maya Bar-Sadan²

¹Department of Chemistry, Technion - Israel Institute of Technology, Israel

²Department of Chemistry, Ben-Gurion University of the Negev, Israel

16:45 Ultrathin Film Iron Oxide ($\alpha\text{-Fe}_2\text{O}_3$) Photoanodes for Solar Powered Water Splitting

Hen Dotan, Avner Rothschild

Department of Materials Engineering, Technion-Israel Institute of Technology, Israel

17:00 Backbone and Charge Group Stability of Quaternized Poly(sulfone) and Poly(phenylene oxide) Anion Exchange Membrane

Alina Amal, Michael Hickner², Yair Ein-Eli¹

¹Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

²Department of Materials Science and Engineering, Pennsylvania State University, USA

17:15 INVITED - Carbon from Waste for Supercapacitor

David Jacob, CEO, IsraZion Ltd, Israel

15:30-17:40 Nano Materials & Nano Technology II (Room 165, 1st Flr.)

Chairs: S. Lifshitz, *Technion-Israel Institute of Technology* and D. Zitoun, *Bar-Ilan University*

15:30 KEYNOTE - Metallic Nanowhiskers: Growth, Microstructure and Properties

Gunther Richter

Prof. Rabkin Research Partner, The German-Israeli Foundation for Scientific Research and Development, Israel

Thin Film Laboratory, Max Planck Institute for Intelligent Systems, Germany

15:55 KEYNOTE - Colloidal Semiconductor Nanorods and Nanorod Couples

Uri Banin, *Institute of Chemistry and the Center for Nanoscience and Nanotechnology, The Hebrew University of Jerusalem, Israel*

16:20 INVITED - Self-Integration of Nanowires Into Circuits via Guided Growth

Ernesto Joselevich, *Department of Materials and Interfaces, Weizmann Institute of Science, Israel*

16:40 Pyroelectricity as an Analytical Method for Probing the Structure of Rough Surfaces

Elena Mirzadeh, *Silvia Piperno, David Ehre, Miriam Eisenstein, Meir Lahav, Igor Lubomirsky, Department of Materials and Interfaces, Weizmann Institute of Science, Israel*

16:55 Mechanically Robust Slippery Coating on Stainless Steel

Alexander B. Tesler^{1,2}, *Philseak Kim*², *Joanna Aizenberg*^{1,2}

¹*School of Engineering and Applied Sciences, Harvard University, USA*

²*Wyss Institute for Biologically Inspired Engineering, Harvard University, USA*

17:10 Titanium Plasma-Column and Nano-Powder Oxide Generated by Localized Microwaves in Air Atmosphere

Simona Popescu¹, *Zahava Barkay*², *Eli Jerby*¹

¹*Faculty of Engineering, Tel-Aviv University, Israel*

²*Wolfson Applied Material Research Center, Tel-Aviv University, Israel*

17:25 Hybrid Organic/Inorganic Electrochromic Devices

Lotem Buchbinder, *Gitti L. Frey*

Department of Materials Science & Engineering, Technion-Israel Institute of Technology, Israel

15:30-17:30 Materials in Biology and Medicine II (Room 815, 8th Flr.)

Chairs: U. Raviv, *The Hebrew University of Jerusalem* and B. Pokroy, *Technion-Israel Institute of Technology*

15:30 KEYNOTE - Where Self-Assembly Meets Pharmaceutical Nanomaterials Science: Some Lessons for the Rational Development of Innovative Pharmaceutical Products

Alejandro Sosnik, *Group of Pharmaceutical Nanomaterials Science, Department of Materials Science and Engineering, Technion- Israel Institute of Technology, Israel*

15:55 INVITED - Conductance Mechanisms of Self-Assembled Peptide Filaments

Nurit Ashkenasy, *Department of Materials Engineering, and the Ilse Katz Institute for Nanoscale Science and Technology, Ben-Gurion University of the Negev, Israel*

16:15 Novel Soy Protein Films with Drug Delivery for Wound Healing Applications

Maya Baranes-Zeevi¹, Yehuda Ullmann^{2,3}, Dana Egozi^{2,3}, Aviad Keren^{2,3}, Norberto Krivoy³, Meital Zilberman¹

¹*Department of Biomedical Engineering, Faculty of Engineering, Tel-Aviv University, Israel*

²*Department of Plastic Surgery and the Burn Unit, Rambam Medical Center, Israel*

³*Faculty of Medicine, Technion – Israel Institute of Technology, Israel*

16:30 Hierarchical Structure and Flexure Behaviour of the Turtle Shell

Ben Achrai¹, Benny Bar-On², H. Daniel Wagner¹

¹*Department of Materials and Interfaces, Weizmann Institute of Science, Israel*

²*Colloids and Interfaces, Max-Planck Institute, Germany*

16:45 Molecular Recognition: Insights from Peptide Co-Assembly and Single-Molecule Force Spectroscopy

Meital Rechtes, *The Institute of Chemistry, The Hebrew University of Jerusalem, Israel*

17:00 Tribology in Full View, From Atomic Wear to Hip Replacements

Laurence Marks, *Department of Materials Science & Engineering, Northwestern University, USA*

17:15 Single Step and Single Component Production of Bio-Inspired Hierarchical Superoleophobic Surfaces

Sasha Pechook, Boaz Pokroy

Department of Materials Science & Engineering, Technion-Israel Institute of Technology, Israel

15:30-17:30 Advanced Materials Characterizations Techniques II

(Auditorium 1003, 10th Flr.)

Chairs: W. D. Kaplan, *Technion-Israel Institute of Technology* and L. Meshi, *Ben-Gurion University of the Negev*

15:30 KEYNOTE - How Can Aberration Corrected TEMs Help to Develop New Materials for Energy Applications?

Joachim Mayer^{1,2}, Maryam Beigmohamadi, Juri Barthel, Stefan Roitsch

¹*Central Facility for Electron Microscopy, RWTH Aachen University, Germany*

²*Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons, Research Centre Juelich, Germany*

15:55 INVITED - Ferroelectric Response of Thin Films and Bulk Materials

John Blendell, Yuanyuan Jing, Meredith Dubleman, Chris Fancher, Matthias Ehmke
School of Materials Engineering, Purdue University, USA

16:15 Focused Ion Beam Processing of Energy Materials: Micro/Nano-Scale Structuring and Electron Tomography Based Analysis

Meltem Sezen¹, Shalima Shawuti², Mehmet Ali Gulgun²

¹*Nanotechnology Research and Application Center, Sabanci University, Turkey*

²*Faculty of Engineering and Natural Sciences, Sabanci University, Turkey*

16:30 Short Range Order in Liquid Pnictides

Martin Mayo¹, Yaron Greenberg², Guy Makov¹, Eyal Yahel²

¹*Materials Engineering Department, Ben-Gurion University of the Negev, Israel*

²*Department of Physics, Nuclear Research Centr-Negev, Israel*

16:45 Structure Solution of Al-Ru-Rh Approximant of Decagonal Quasicrystal from Automated Electron Diffraction Tomography Data

Shmuel Samuha¹, Enrico Mugnaioli², Benjamin Grushko³, Ute Kolb², Louisa Meshi¹

¹*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

²*Department of Physical Chemistry, Johannes Gutenberg-University, Germany*

³*PGI-5, Forschungszentrum Jülich, Germany*

17:00 Mechanical Properties of Electrospun PMMA Micro-Yarns: Effects of NaCl Mediation and Yarn Twist

Xiaomeng Sui, Erica Wiesel, H. Daniel Wagner

Department of Materials and Interfaces, Weizmann Institute of Science, Israel

17:15 AFM Nanoindentation of Iron Particles on Sapphire Produced by Solid State Dewetting

Oleg Kovalenko, Eugen Rabkin

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

15:30-17:30 Physical Metallurgy (Room 351, 3rd Flr.)

Chairs: S. Hayun, Ben-Gurion University of the Negev and **Y. Amouyal**, Technion-Israel Institute of Technology

15:30 KEYNOTE - Shape and Orientation Relationship of Metallic Crystals on Oxide Surfaces: The Role of the Triple Line

Dominique Chatain, CNRS, CINaM, UMR 7325, Aix-Marseille University, France

15:55 INVITED - The Elastic Contribution to the Thermodynamics of Martensite Phase Transformation in Nickel Steel

Roni Shneck, Ayala Wasserblat

Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

16:15 Grain Boundary Grooving: Interface Diffusion

Dor Amram, Leonid Klinger, Nimrod Gazit, Haggai Gluska, Eugen Rabkin

Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

16:30 The Nature of the Metamagnetic Transition in Heusler Alloy

Ni_{44.9}Mn₄₃In_{12.1} Studied for Magnetic Refrigeration Application

Pnina Ari-Gur¹, Amila Madiligama¹, Israel Felner², M.I. Tsindlekht², Yang Ren³, Vladimir Shavrov⁴, Victor Koledov⁴, Alexander Mashirov⁴

¹*Department of Mechanical & Aerospace Engineering, Western Michigan University, USA*

²*The Racah Institute of Physics, The Hebrew University of Jerusalem, Israel*

³*Department of Advanced Photon Source, Argonne National Laboratory, USA*

⁴*Institute of Radio-engineering and Electronics, Russian Academy of Sciences, Russia*

16:45 The Role of Nanograins in Formation of Adiabatic Shear Bands in Mg-An Atomistic Study

Sagi Chen, Dan Mordehai, Daniel Rittel

Department of Mechanical Engineering, Technion-Israel Institute of Technology, Israel

17:00 Mechanisms of Nucleation and Growth of Metastable Phases in Mg-Gd and Mg-Gd-Nd Based Alloys

Alex Katsman, Suzan Abd El Majid, Menahem Bamberger

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

17:15 Micro Laminated Graded Hybrid

Dov Chaiat, *President, Smart Materials, Israel*

20:00-22:00

Gala Dinner at "Bikta Baya'ar", Beit Oren (*Optional*)

In the program:

Dr. Adam Ehrenraich lecturing on "Joint Replacement Surgery - The Man to Metal Interface"

Ziv Eitan, the International Marimba and Percussion Artist - "A Journey Into the Rhythm"

Tuesday, February 25, 2014

08:30-09:15 Plenary III (*Auditorium 280, 2nd Flr.*)

Chair: E. Zolotoyabko, *Technion-Israel Institute of Technology*

08:30 Nanomaterials at Interfaces: Wet Chemical Routes for Size, Shape and Orientation Controlled Nanomaterials

Yuval Golan, Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

09:15-10:00 Plenary IV (*Auditorium 280, 2nd Flr.*)

Chair: E. Zolotoyabko, *Technion-Israel Institute of Technology*

09:15 Multi-Scale Structure and Mechanical Behavior of Natural Composite Materials

Peter Fratzl, Managing Director, Max Planck Institute of Colloids and Interfaces, Germany

10:00-11:00 Coffee Break (Foyer) & Poster Session* (3rd Flr.)

**See list on pages 39-49*

11:00-13:00 Electronic Materials and Thin Films (Auditorium 280, 2nd Fl.)

Chairs: Y. Gelbstein, *Ben-Gurion University of the Negev* and N. Tessler, *Technion-Israel Institute of Technology*

11:00 INVITED - Heterogeneous Stress Relaxation in Thin Films: Whiskers, Hillocks, and Beyond

Carol Handwerker¹, John Blendell¹, Pylin Sarobol¹, Wei-Hsun Chen¹, Ying Wang¹, John Koppes¹, Aaron Pedigo¹, Stefano Curiotto², Dominique Chatain², Maureen Williams³

¹*Department of Materials Science and Engineering, Purdue University, USA*

²*Campus de Luminy, CINaM-CNRS, France*

³*Department of Materials Science and Engineering, NIST, USA*

11:20 INVITED - Organizing Nanoparticles Into Hierarchical Structures by Non-Lithographic Means

Roy Shenhar, *Institute of Chemistry, The Hebrew University of Jerusalem, Israel*

11:40 INVITED - Sensing Spin and Spinning Memory - A Chiral-based Spin Sensors and Magnetic Memory Devices without a Permanent Magnet

Yossi Paltiel, *School of Engineering and Computer Science, Faculty of Science, The Hebrew University of Jerusalem, Israel*

12:00 Solid – State Dewetting Kinetics of Pt Thin Films

Galit Atiya¹, Vissarion Mikhelashvili², Gadi Eisenstein², Wayne D. Kaplan¹

¹*Department of Materials Science & Engineering, Technion-Israel Institute of Technology, Israel*

²*Department of Electrical Engineering, Technion-Israel Institute of Technology, Israel*

12:15 Buried Graphite Pillars in Single Crystal CVD Diamond: Sensitivity to X-Rays and Electrons

Gennaro Conte¹, Marco Pacilli¹, Paolo Allegrini¹, Daniele Maria Trucchi², Taras Kononenko³, Andrey Bolshakov³, Victor Ralchenko³, Vitali Konov³

¹*Department of Sciences, University Roma Tre, Italy*

²*Department of IMIP, CNR, Italy*

³*Department of RAS, General Physics Institute, Russia*

12:30 The Effect of Crystallographic Orientation of Sodium Nitrite Nano-Crystals on their Pyroelectric and Dielectric Properties

Hanna Bishara, Shlomo Berger

Materials Science and Engineering Faculty, Technion-Israel Institute of Technology, Israel

12:45 Phase Formation at the Interface Between Nanometers Thick Ni Films and $\text{In}_{0.53}\text{Ga}_{0.47}\text{As}$

Pini Shekhter¹, Shlomo Mehari², Dan Ritter², Moshe Eizenberg¹

¹*Department of Material Science and Engineering, Technion-Israel Institute of Technology, Israel*

²*Department of Electrical Engineering, Technion-Israel Institute of Technology, Israel*

11:00-13:00 Polymers and Colloids (Room 165, 1st Flr.)

Chairs: Eli Sloutskin, *Bar-Ilan University* and **M. Silverstein**, *Technion-Israel Institute of Technology*

11:00 KEYNOTE - Ion-Containing Polymers for New Energy and Clean Water

Michael A. Hickner, *Department of Materials Science and Engineering, The Pennsylvania State University, USA*

11:25 INVITED - Bernal Packings of Colloids: Dense Colloidal Fluids Form Denser Amorphous Sediments

Eli Sloutskin, Alexander V. Butenko, Shir R. Liber

Department of Physics and Institute for Nanotechnology and Advanced Materials, Bar-Ilan University, Israel

11:45 Multilayered Metal/ Polypyrrole Electrodes for Biosensors

Rakefet Ofek Almog¹, Yelena Sverdlov², Sefi Vernick², Yosi Shacham-Diamand²

¹*Department of Advanced Materials Engineering, Azrieli College of Engineering Jerusalem, Israel*

²*Department of Physical Electronics, School of Electrical Engineering, Faculty of Engineering, Tel-Aviv University, Israel*

12:00 Tensile Stress Effect on the Macromolecular Orientation and Erosion Mechanism of an Atomic Oxygen Irradiated Polyimide

Ronen Verker¹, Nurit Atar¹, Franck Quero², Stephen Eichhorn³, Eitan Grossman¹

¹*Department of Space Environment, Soreq NRC, Israel*

²*Material Sciences Centre, University of Manchester, UK*

³*College of Engineering, Mathematics & Physical Sciences, University of Exeter, UK*

12:15 Novel Conductive Hybrid Nano-Composites for Electro-Mechanical Sensors

Irena Brook^{1,2}, Guy Mechrez¹, Ran Y. Suckeveriene^{1,3}, Roza Tchoudakov¹, Moshe Narkis¹

¹*Department of Chemical Engineering, Technion-Israel Institute of Technology, Israel*

²*Interdepartmental Program in Polymer Engineering, Technion-Israel Institute of Technology, Israel*

³*Department of Water Industries Engineering, Kinneret College in the Jordan Valley, Israel*

12:30 Hybrid Polyaniline/CNT Nanocomposites Prepared by an Inverse Emulsion Polymerization Technique

Ran Suckeveriene^{1,2}, Guy Mechrez¹, Irena Brook^{1,3}, Moshe Narkis¹

¹*Department of Chemical Engineering, Technion-Israel Institute of Technology, Israel*

²*Department of Water Industries Engineering, Kinneret College in the Jordan Valley, Israel*

³*Interdepartmental Program in Polymer Engineering, Technion-Israel Institute of Technology, Israel*

12:45 Shape Memory Mechanism in Electrospun Block Co-Polymer TPU Nanofibers

Dimitry Alhazov, Michael Burman, Arkadii Arinstein, Eyal Zussman

Faculty of Mechanical Engineering, Technion - Israel Institute of Technology, Israel

11:00-13:00 Computational Materials I (Room 815, 8th Flr.)

Chairs: H. Senderowitz, Bar-Ilan University and M. Caspari Trokor, Technion-Israel Institute of Technology

11:00 KEYNOTE - Atomistic Studies of Dislocation Structure and Motion

Guy Makov, Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

11:25 INVITED - Ferroelectric Domain Walls in Bismuth Ferrite: A First-Principles Study

Oswaldo Dieguez¹, Pablo Aguado-Puente², Javier Junquera³, Jorge Iniguez⁴

¹Department of Materials Science and Engineering, Tel-Aviv University, Israel

²Theory, CIC nanoGUNE, Spain

³Departamento CITIMAC, Universidad de Cantabria, Spain

⁴Theory and Computation, ICMAB-CSIC, Spain

11:45 Band Gap Calculations with DFT Revisited: Restoring the Derivative Discontinuity via the Ensemble Approach

Eli Kraiser, Leeor Kronik

Department of Materials and Interfaces, Weizmann Institute of Science, Israel

12:00 Infrared Absorption Spectrum of Brushite from First-Principles

Anna Hirsch¹, Ido Azuri¹, Lia Addadi², Stephen Weiner², Kesong Yang³, Stefano Curtarolo³, Leeor Kronik¹

¹Department of Materials and Interfaces, Weizmann Institute of Science, Israel

²Department of Structural Biology, Weizmann Institute of Science, Israel

³Department of Mechanical Engineering and Materials Science, Duke University, Israel

12:15 Self and Interaction Elastic Energy of Precipitates in Maraging Steels: Theoretical Modeling and Experimental Validation

Mati Shmulevitch¹, Roni Shneck², Malki Pinkas¹

¹Department of Materials, NRCN, Israel

²Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

12:30 Electronic Structure and Sulfur Adsorption on (001) Surface of Ni_xP Phases

Dimitro Vingurt¹, David Fuks¹, Miron Landau²

¹Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

²Department of Chemical Engineering, Ben-Gurion University of the Negev, Israel

12:45 Thermodynamic Properties of Titanium Group Metals from Ab-initio Calculations

Uri Argaman¹, Eitan Eidelstein², Ohad Levy², Guy Makov¹

¹*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

²*Department of Physics, NRCN, P.O. Box 9001, Israel*

11:00-13:00 Physics & Chemistry of Materials (Auditorium 1003, 10th Fl.)

Chairs: R. Shneck, Ben-Gurion University of the Negev and E. Rabkin, Technion-Israel Institute of Technology

11:00 KEYNOTE - Electronic and Magnetic Quantum Size Effects in Mesoscopically-Ordered Silicide Nanoislands

Ilan Goldfarb¹, Jitendra Tripathi¹, Shirley Manor¹, Evgeny Roizin¹, Mario Levinshtein¹, Eran Rabani², Gil Markovich², Wayne Kaplan³, Magnus Garbrecht³

¹*Department of Materials Science and Engineering, Tel-Aviv University, Israel*

²*School of Chemistry, Tel-Aviv University, Israel*

³*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

11:25 INVITED - Direct Photocatalytic Production of Hydrogen Peroxide from Water and Oxygen by Hybrid Metal Oxide-Noble Metal Catalyst Prepared by Molecular Layer Deposition

Roie Yerushalmi, Niv Kaynan, Binyamin Adler Berke

Department of Chemistry, The Hebrew University of Jerusalem, Israel

11:45 High Temperature Ice Nucleation Induced by Pyroelectric Effect in Amino Acids Crystals

Alik Belitzky, David Ehre, Eran Mishuk, Meir Lahav, Igor Lubomirsky

Department of Materials and Interfaces, Weizmann Institute of Science, Israel

12:00 Formation of Gallium Micro-and Nano-Spheres by Ultrasonic Cavitation and Entrapment of Organic Compounds within Them

Vijay Bhooshan Kumar¹, Aharon Gedanken¹, **Ze'ev Porat**²

¹*Department of Chemistry, Bar-Ilan University, Israel*

²*Department of Chemistry, Nuclear Research Center-Negev, Israel*

12:15 Magnetic Circular Dichroism with Table-Top Source of Extreme-UV Ultra-Short Pulses

Ofer Kfir¹, Patrik Grychtol², Emrah Turgut², Ronny Knut³, Dmitry Zuskin², Dimitar Popmintchev², Tenio Popmintchev², Hans Nembach³, Justin Shaw³, Avner Fleischer¹, Henry Kapteyn², Margaret Murnane², Oren Cohen¹

¹*Department of Physics and Solid State Institute, Technion-Israel Institute of Technology, Israel*

²*Department of Physics and JILA, University of Colorado and NIST, USA*

³*Department of Electromagnetics, National Institute of Standards and Technology, USA*

12:30 A New Concept in Radiation Damage Studies: Model System for Self-Induced Radiation Damage Experiments in Thin Films

Michael Shandalov¹, Tzvi Tempelman², Rafael Hevroni³, Itzhak Kelson³, Eyal Yahel¹, Yuval Golan²

¹*Department of Physics, NRCN, Israel*

²*Ilse Katz Institute for Nanoscale Science and Technology, Ben-Gurion University, Israel*

³*School of Physics and Astronomy, Tel-Aviv University, Israel*

12:45 Wet-chemistry Deposition of Semiconductor Nanostructured for IR Photovoltaics

Ronen Gertman^{1,2}, Yaron Berger¹, Adi Harush¹, Anna Osherov³, Yuval Golan^{2,3}, **Iris Visoly-Fisher**^{2,4}

¹*Department of Chemistry, Ben-Gurion University of the Negev, Israel*

²*Ilse Katz Institute for Nano-scale Science and Technology, Ben-Gurion University of the Negev, Israel*

³*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

⁴*Department of Solar Energy and Environmental Physics, Swiss Institute for Dryland Environmental and Energy Research, Blaustein Institutes for Desert research, Ben-Gurion University of the Negev, Israel*

11:00-13:00 Corrosion, Surface Treatments and Coatings

(Room 351, 3rd Flr.)

Chairs: N. Eliaz, Tel-Aviv University and M. Bamberger, Technion-Israel Institute of Technology

11:00 KEYNOTE - Mechanism of Hydrogen Evolution on Dissolving Mg Surfaces

A. Samaniego^{1,2}, B. Hurley¹, **Gerald S. Frankel**¹

¹*Fontana Corrosion Center, The Ohio State University, USA*

²*Department of Materials Engineering, Corrosion and Durability, CENIM, Spain*

11:25 Formation of Re-Ni and Re-Co Coatings Using Electroless Plating for High-Temperature Applications

Alla Duhin¹, Alexandra Inberg², Noam Eliaz¹, Eliezer Gileadi³

¹*Department of Materials Science and Engineering, Tel-Aviv University, Israel*

²*Department of Physical Electronics, Tel-Aviv University, Israel*

³*School of Chemistry, Faculty of Exact Science, Tel-Aviv University, Israel*

11:45 Preparation and Characterization of Organic Self-Assembled Monolayers Chemisorbed and Electrochemically Prepared on Titanium Alloy

Noah Metoki¹, Liang Liu², Noam Eliaz¹, Daniel Mandler²

¹*School of Mechanical Engineering & The Material and Nanotechnologies Program, Tel Aviv University, Israel*

²*Department of Inorganic and Analytical Chemistry, The Hebrew University of Jerusalem, Israel*

12:00 Ball Milled $\text{TiH}_2/\text{TiO}_2$ as Pt Support Material for Oxygen Reduction

Olga Krichovski, Victor Multanen, Yuval Moshe, Alex Schechter

Department of Biological Chemistry, Ariel University, Israel

12:15 Preadhesion Nd:YAG Laser Surface Treatment for Hard-to-Bond Materials

Alisa Buchman¹, Malka Rotel², Shoshana Tamir³

¹*Department of Composite Materials, Rafael Ltd., Israel*

²*Institute of Metals, Technion-Israel Institute of Technology, Israel*

³*Department of Materials, Technion-Israel Institute of Technology, Israel*

12:30 Tribological Properties of Nanocomposite $\text{ZrO}_2\text{-Al}_2\text{O}_3$ Coatings

Ido Zukerman¹, Avi Raveh², Raymond L. Boxman³

¹*Division of Chemistry, NRCN, Israel*

²*Advanced Coatings Center, Rotem Industries Ltd., Israel*

³*Faculty of Engineering, Tel Aviv University, Israel*

12:45 Hybrid Organic/Inorganic Corrosion Mitigation of Aluminum for Power Sources

Danny Gelman^{1,2}, Itay Lasman², Sergey Elfimchev^{1,2}, David Starosvetsky², Yair Ein-Eli^{1,2}

¹*The Nanacy and Stephen Grand Technion Energy Program, Technion- Israel Institute of Technology, Israel*

²*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

13:00-14:00 Lunch (Olive Trees Garden-Russel Berrie Promenade)

14:00-15:00 Poster Session (3rd Flr.) (See list on pages 47-61)

15:00-17:00 Semiconductors & Electronic Materials

(Auditorium 280, 2nd Flr.)

Chairs: M. Eizenberg, Technion-Israel Institute of Technology and **I. Goldfarb**, Tel-Aviv University

15:00 KEYNOTE - Engineering Materials and Devices for Printed Electronics

Nir Tessler, Department of Electrical Engineering (EE), Technion-Israel Institute of Technology, Israel

15:25 INVITED - Electronic Properties of Hybrid Semiconductor-Metal Nanoparticles

Oded Millo, Racah Institute of Physics, The Hebrew University of Jerusalem, Israel

15:45 Thermal Evaporation of Metal Electrodes Induces Additive Segregation and Enhances Performance in Organic Photovoltaic Films

Igal Dekman¹, Reuven Brenner², Gitti Frey¹

¹Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

²Solid State Institute, Technion-Israel Institute of Technology, Israel

16:00 The Nucleation-to-Percolation Transition during Metal Thin Film Growth Over Polycrystalline Titanium Nitride

Avraham Rozenblat-Raz^{1,2}, Dror Horvitz¹, Yosi Shacham-Diamand²

¹MA Labs, Micron Semiconductors Israel Ltd., Israel

²Department of Physical Electronics, Electrical Engineering, Tel-Aviv University, Israel

16:15 Magneto-photocurrent in Organic Photo-voltaics: The Effect of Short Lived Charge Transfer States

Ayeleth Devir-Wolfman¹, Bagrat Khachatryan¹, Nir Tessler¹, Eitan Ehrenfreund¹, Bhoj Gautam², Zeev Vardeny²

¹Solid State Institute, Technion-Israel Institute of Technology, Israel

²Department of Physics and Astronomy, University of Utah, USA

16:30 High-K Dielectrics for High Mobility Ge Mos Devices

Sivan Fadida, Felix Palumbo, Laura Nyns, Dennis Lin, Sven Van Elchocht, Matty Caymax, Moshe Eizenberg

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

16:45 Structure Manipulation in ALD Deposited Amorphous Thin Films

Leonid Bloch^{1,2}, Boaz Pokroy^{1,2}

¹Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

²Department of Materials Science and Engineering, Russell Berrie Nanotechnology Institute, Israel

15:00-17:00 Thermoelectric & Metallurgical Materials (Room 165, 1st Flr.)

Chairs: N. Frage, Ben-Gurion University of the Negev and E. Glickman, Ben-Gurion University of the Negev

15:00 INVITED - Toward Higher Thermoelectric Efficiency for Power Generation Applications

Yaniv Gelbstein, Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

15:25 INVITED - Improving Performances of Thermoelectric Materials for Energy Harvesting: Experimental and Computational Approaches

Yaron Amouyal, *Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

15:45 Enhancing Thermoelectric Performance of PbTe-based Compounds by Substituting Elements: A First-principles Study

Elad Joseph, Yaron Amouyal

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

16:00 Modeling of the Thermochemistry and Thermophysical Properties of Fe-Ni Alloys

Eli Brosh, *Department of Materials, NRCN, Israel*

16:15 Effects of Lattice Defects Thermoelectric Properties of Calcium-Manganite Compounds for Energy Harvesting Applications

Ayelet Graff, Yaron Amouyal

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

16:30 Interfacial Titanium Carbide Layer in the Solid State Bonded Ti-6Al-4V Alloy to Carbon Steel Joints: Thermal Stability and Growth Kinetics

Aslan Miriyev, Michael Sinder, Nachum Frage

Department of Materials Engineering, Ben-Gurion University of the Negev, Israel

16:45 Effect of Impurity Levels on the Structure of Solidified Aluminum under Pulse Magneto-oscillation (PMO)

Itzhak Edry^{1,2}, Vitaly Erukhimovitch¹, Nahum Frage¹, Shmuel Hayun¹

¹*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

²*Department of Materials, Nuclear Research Center of the Negev (NRCN), Israel*

15:00-17:00 Computational Materials II – Energy (Room 815, 8th Flr.)

Chairs: L. Kronik, *Weizmann Institute of Science* and **O. Dieguez**, *Tel-Aviv University*

15:00 KEYNOTE - Data Mining Tools for Combinatorial Material Science of All-Oxide Photovoltaic Cells

Hanoch Senderowitz¹, Abraham Yosipof¹, Assaf Anderson², Hannah Noa Barad², Sven Rühle², Arie Zaban²

¹*Department of Chemistry, Bar-Ilan University, Israel*

²*Center for Nanotechnology & Advanced Materials, Bar-Ilan University, Israel*

15:25 INVITED - Transition Metal Oxide Alloys as Potential Solar Energy Conversion Materials

Maytal Caspary Toroker, *Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

15:45 Gap Renormalization of Molecular Crystals from Density-Functional Theory

Sivan Refaely-Abramson¹, Sahar Sharifzadeh², Manish Jain³, Roi Baer⁴, Jeffrey B. Neaton², Leeor Kronik¹

¹*Department of Materials and Interfaces, Weizmann Institute of Science, Israel*

²*Molecular Foundry, Lawrence Berkeley National Laboratory, USA*

³*Department of Physics, Indian Institute of Science, India*

⁴*Fritz Haber Center for Molecular Dynamics, Institute of Chemistry, Hebrew University, Israel*

16:00 Designing Energy Efficient Materials *in Silico*: The Case of $\alpha\text{-Fe}_2\text{O}_3$.A Computational and Experimental Study

Monica Kosa, Hannah Noa Barad, David Keller, Sven Rühle, Arie Zaban, Dan Thomas Major
Department of Chemistry, Bar-Ilan University, Israel

16:15 Graphene Functionalization by Single Atom Doping - a Theoretical Study

Amir Natan¹, Elad Segev¹, Mark Hersam³, Tamar Seideman²

¹*Department of Physical Electronics, Tel-Aviv University, Israel*

²*Department of Chemistry, Northwestern University, USA*

³*Department of Materials Science and Engineering, Northwestern, USA*

16:30 Proton Diffusion at the Wet YSZ Surface: An *Ab Initio* Study

Clotilde Cucinotta¹, Stefano Sanvito¹, Marco Bernasconi²

¹*School of Physics and CRANN, Trinity College, Ireland*

²*Department of Materials Science, University of Milano Bicocca, Italy*

16:45 *Ab Initio* Modeling of Perovskite Solid Solutions for Solid Oxide Fuel Cells and Permeation Membranes

Eugene Kotomin¹, David Fuks³, Maija Kuklja⁴, Yuri Mastrikov², Rotraut Merkle¹, Joachim Maier¹

¹*Department of Physical Chemistry, Max Planck Institute, Germany*

²*Department of Theoretical, Institute of Solid State Physics, Latvia*

³*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

⁴*Department of Materials Science Engineering, University of Maryland, USA*

15:00-17:00 Ceramic Materials, Processing & Forming of Materials

(Auditorium 1003, 10th Flr.)

Chairs: M. Dariel and D. Fuks, *Ben-Gurion University of the Negev*

15:00 INVITED - The Effect of Magnesium Aluminate Spinel Composition on Consolidation by Spark Plasma Sintering (SPS)

Shmuel Hayun, *Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

15:20 INVITED - Wetting and Interface Interactions in the Carbides, Borides, Oxides and Fluorides - Metal Systems

Michael Aizenshtein¹, Shmuel Barzilai¹, Natalie Froumin², Nachum Frage²

¹*Department of Materials, NRC-Negev, Israel*

²*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

15:40 INVITED - Nature of the Insulator-Metal transition in Vanadium Oxides

Amos Sharoni, *Institute of Nanotechnology & Advanced Materials, Bar-Ilan University, Israel*

16:00 Spark Plasma Sintering Study: Hard Versus Soft Ceramics

Rachel Marder¹, Claude Estournès², Geoffroy Chevallier², Serguey Kalabukhov³, Rachman Chaim¹

¹*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

²*Institut Carnot Cirimat, Université de Toulouse, France*

³*Department of Materials Engineering, Ben-Gurion University of the Negev, Israel*

16:15 Electro-Magnetic forming of Magnesium Alloys

Adi Ben-Artzy, *Department of Material Engineering, NRCN, Israel*

16:30 Roll Forming Metal Matrix Sheets Containing Diamonds

Jean Ramon, Olga Botstein, *Metallurgical Lab., Technion R&D Foundation, Israel*

16:45 Phases Development in Geopolymeric Systems at Moderate Temperatures

Ela Ofer-Rozovsky¹, Michal Arbel-Haddad², Gabriela Bar-Nes², Amnon Katz¹

¹*Faculty of Civil and Environmental Engineering, Technion-Israel Institute of Technology, Israel*

²*Department of Chemistry, Nuclear Research Center- Negev, Israel*

17:00-17:30 Closing Session Auditorium 280, 2nd Flr.

Chair: Y. Ein-Eli, *Technion-Israel Institute of Technology*

Monday, February 24, 2014

Energy Materials

1 Optimization of Transition Metal Olivine Phosphates as Cathode Materials

Monica Kosa, Dan Thomas Major

Department of Chemistry, Bar-Ilan University, Israel

2 Reduced Graphene Oxide Silicon Composite for Lithium Ion Batteries

Yana Miroshnikov, Gal Grinbom, Gregory Gershinsky, David Zitoun

Department of Chemistry, Bar-Ilan University, Israel

3 Oxygen Reduction on N-CNT for Metal-Air Batteries and Fuel Cells

Asaf Cohen¹, Alex Schechter¹, Hanan Teller¹, Daniel Nessim², Eti Teblum²

¹*Department of Biologic-Chemistry, Ariel University, Israel*

²*Department of Chemistry / Nanotechnology, Bar-Ilan University, Israel*

4 Electrical Characteristics of CuO Electrodes for Thermal Batteries

Tomer Leviatan^{1,2}, Tal-El Shaul², Shlomo Berger¹

¹*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

²*Department of Energy Sources, Rafael Ltd., Israel*

5 Molecular Vapor Deposition for Processing Hybrid ZnO/P3HT Solar Cells

Stas Obuchovsky¹, Guy Ankonina², Gitti Frey¹

¹*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

²*Russel Berrie Nanotechnology Institute, Technion-Israel Institute of Technology, Israel*

6 One-step Synthesis of Polycrystalline α -Mn₂O₃ by Spray Pyrolysis for Potential All-Oxide Photovoltaics Application

Adam Ginsburg, Sven Ruhle, Arie Zaban

Department of Chemistry, Bar-Ilan University, Israel

7 Self-assembled Photo-active Organic Molecules as Metal Oxide Templates for Hybrid Photovoltaics

Moshe Moshonov, Gitti Frey

Department of Materials Science & Engineering, Technion-Israel Institute of Technology, Israel

8 Iron Oxide ($\alpha\text{-Fe}_2\text{O}_3$) Thin Film Photoanodes for Solar Powered Water Splitting

Asaf Kay, Avner Rothschild

Department of Material Science and Engineering, Technion-Israel Institute of Technology, Israel

9 Combinatorial Photovoltaic Device Libraries: A Powerful Method for the Investigation of $\text{TiO}_2/\text{Cu}_2\text{O}$ Heterojunction Solar Cells

Hannah Noa Barad, Sven Rühle, Assaf Anderson, Yaniv Bouhadana, Adam Ginsburg, David Keller, Arie Zaban

Department of Chemistry and The Institute for Nanotechnology and Advanced Materials, Bar-Ilan University, Israel

10 Combinatorial Study of $\text{Fe}_2\text{O}_3\text{-Nb}_2\text{O}_5$ Library for All-Oxide Photovoltaics

David A. Keller, Klimentiy Shimanovich, Hannah-Noa Barad, Assaf Y. Anderson, Yaniv Bouhadana, Adam Ginsburg, Eli Rosh-Hodesh, Koushik Majhi, David Sriker, Sven Rühle, Arie Zaban

Department of Chemistry, Bar-Ilan University, Israel

11 Cu_2O Thin Films for Photovoltaic Tandem Cells

Oshri Blank¹, Guy Ankonina², Avner Rothschild¹

¹*Department of Material Science and Engineering, Technion-Israel Institute of Technology, Israel*

²*Photovoltaics Laboratory, Technion-Israel Institute of Technology, Israel*

12 The Effects of Mechanical Alloying on the Thermoelectric Properties of MoS_2

Sagi Appel¹, Alex Volman¹, Yaniv Gelbstein¹, Maya Bar-Sadan²

¹*Department of Material Engineering, Ben-Gurion University, Israel*

²*Department of Chemistry, Ben-Gurion University, Israel*

13 Enhancement of the Thermoelectric Conversion Efficiency of $(\text{PbTe})_{1-x}(\text{Ag}_2\text{Te})_x$ Compounds for Renewable Energy Applications

Tom Grossfeld, Yaron Amouyal

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

14 On the Thermal Conductivity of Two-Phase Ag-Sb-Te-Based Thermoelectric Materials: Correlating Theory with Experiment

Boris Nijikovsky, Yaron Amouyal

Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel

15 Characterization of the Transport Properties of Highly Efficient Germanium Telluride-based Thermoelectric Materials

Joseph Davidow, Yaniv Gelbstein

Department of Materials, Ben-Gurion University of the Negev, Israel

16 Novel Ferroelectric-Thermoelectric Oxide Materials

Yoed Tsur², Clive A. Randall³, Jonathan A. Bock³, Sioma Baltianski², **Neta Shomrat**¹

¹*The Interdisciplinary Energy Graduate Study Program, Technion-Israel Institute of Technology, Israel*

²*Department of Chemical Engineering, Technion-Israel Institute of Technology, Israel*

³*Center for Dielectric Studies, Materials Research Institute, The Pennsylvania State University, USA*

17 Particle Grouping in Internal Combustion Engine Exhaust System

Daphne Meidan, Roni Shneck, Eran Sher, Nachum Frage, David Katoshevski

Department of Material Engineering, Ben-Gurion University, Israel

18 Plasmonic Au Nanoparticles Embedded in Ultrathin Film Fe₂O₃ Photoanodes for Solar Powered Water Splitting

Moran Gross Koren, Avner Rothschild

Department of Materials and Science Engineering, Technion-Israel Institute of Technology, Israel

Nano and Bio Materials

19 Microstructure of Ni-SiC Nanocomposites

Dana Benes Dahan^{1,2}, Eran Gros¹, Wayne D. Kaplan¹

¹*Department of Materials Science and Engineering, Technion-Israel Institute of Technology, Israel*

²*Department of Research, Plasan Ltd, Israel*

20 Electronic Optimization of the Transport Properties of n-type PbTe-PbS, following a Phase Separation Reaction on the Nanoscale

Eden Hazan, Ohad Ben-Yehuda, Maya Parag, Yair George, Yaniv Gelbstein

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21 Structural Characterization of New Ternary Yttrium–Rare Earth Sesquioxides Formed by the Sol–Gel Technique

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22 Photosensitivity and Photostability of CdS Nanoparticle Suspensions

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23 Twinning and Phase Control in Template Directed ZnS and (Cd,Zn)S Nano-crystals

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24 Millimeter-Tall Carpets of Vertically Aligned Crystalline Carbon Nanotubes Synthesized on Copper Substrates for Electrical Applications

Eti Teblum, Malachi Noked, Anna Kerman, Merav Muallem, Yaakov Tischler, Doron Aurbach, Gilbert Nessim

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25 A Unique Surface Modification of Silica Nanoparticles with Polyethyleneimine (PEI) for siRNA Delivery Using Cerium Cation Coordination Chemistry

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26 Exfoliation and Restacking of Single Layers of MoS₂ and WS₂:

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27 A New Method of Growing Pyroelectric Mg₃B₇O₁₃Cl Nano-Crystals with Preferred Crystallographic Orientation

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28 MD Simulations of Four-point Bending and Impact Tests of Graphene Single-layers

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29 Bimetallic and Hollow Magnetic Nanostructures

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30 Diffusion-controlled Formation of Freestanding Gold Nanotubes

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31 Self-Integration of Nanowires into Circuits via Guided Growth

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32 Spatially Resolved Doping Profiles in Top-Down Fabricated Poly-Silicon Nanowires

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33 Extremely Low Impact Energy (EXLIE) SIMS Depth Profiling (Trace Element Profiling with Sub-nm Depth Resolution) with SC Ultra

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34 New Applications in Atom Probe Tomography

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35 Electrically-Conductive Flexible CNT-Polyimide Nanocomposites

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36 Nano-Structures Present In Arc Melted and Hot Pressed Higher Manganese Silicide

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37 Bio-inspired ZnO Band Gap Engineering: Intracrystalline Incorporation of Amino Acids

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38 Bio-inspired Growth of Curved Micron-Sized Single Crystals of Gold

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39 Development of Tricalcium Phosphate-Zn Composite for Bioresorbable Load-bearing Bone Healing Implants

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40 Natural Bio-adhesives based on Gelatin & Alginate with Controlled Release of Antibiotic Drug

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41 Composite Bioadhesives Based on Natural Polymers and Hemostatic Agents

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42 Effect of the Side Chain on the Conductance of Cyclic Peptide Molecular Junction

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43 Novel Soy Protein-based Porous Structures for Tissue Regeneration Application

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44 Coralline Algae: A Potential of Ceramic Foam Composite Material for Orthopedic Application Based on Biomimetics

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45 Nonlinear Optical Bio-inspired Peptide Nanostructures

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46 A Novel Nanocomposite Material for Bone Fracture Healing: Production and Advanced Characterization

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Mechanical Behavior of Materials

47 Electrochemically Enhanced Plasticity of Metals

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48 The Influence of Hydrogen on Thermal Desorption Processes in Structural Materials

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49 Mechanical Damage to 450mm Silicon Wafers Caused by Indentation

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50 The Interfacial Shear Strength between CNTF and Epoxy

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51 The Influence of Micro- and Macro Continuous Tensile Deformation on the Microstructure and Anisotropic Grain Changing of Copper Sheets

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52 Tensile Strength of Ti to Steel Diffusion Bonds

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53 The Improvement of the Mechanical Properties of Carbonized Aisi 4330m Steel by Controlling the Thermal Path and Carbonization Process

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54 Mechanical and Acoustical Response of Graphite with Different Micro-structural Features in Various Modes of Loading

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55 The Influence of Hydrogen on the Microstructure and Dynamic Strength of Lean Duplex Stainless Steel

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56 Creep Fracture Model for ODS Steels Used As Fuel Cladding Materials in Gen IV Nuclear Reactors

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57 Ultra-High Torsional Stiffness and Strength of Boron Nitride Nanotubes

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58 Cracks in the High Energy Speed Regime: Initiation Energy and Interaction with Stress Waves

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59 Mechanical Properties of Glass Fiber Reinforced Polymers: Dependence on Fiber Orientation and Matrix Type

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60 Microstructure and Mechanical Properties of Spark Plasma Sintered Aluminum Powders

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Physical Metallurgy

61 Production of Mg Foams by Powder Metallurgy Technology

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62 Microstructure and Phase Transitions in 304L Steel Used for Pipes in Hagit Power Station

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63 DFT Study of Antisite Defects and Stability of TiNiSn

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64 Reaction Fronts of Dopant Metal Ion Valence Transformations during Oxygen Vacancy Diffusion in Oxide Crystals

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65 Site-specific Dopant Profiling Applications in the Dual Beam FIB-SEM System

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66 The Effect of Impurities and Annealing Atmosphere on Solid-state Dewetting of Thin Au Films

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67 Rapid Manufactured Thermoplastic Satellite Structure for QB50 Mission

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68 An Engineering Analysis and Archaeometric Approach of the Ancient Hebron Glass and Reconstruction of the Lost Glass-Making Process

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69 Influence of Grain Size on Fluidity of A713 Cast Alloys in Sand Casting Using Double Spiral Fluidity Test

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70 Microstructure Evolution of AZ31 Magnesium Alloy Under Dynamic Loading

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71 Analysis of Failure through Fracture of the 'Liberator' Rapid Prototyped Gun

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72 Spatially Resolved High throughput Electrical Characterization of Inhomogeneous NiO Coatings Prepared by Pulsed Laser Deposition

Klimentiy Shimanovich, Sven Ruhle, Gili Taguri, Yaniv Bouhadana, David Keller, Koushik Majhi, Assaf Anderson, Hanah-Noa Barad, Adam Ginsburg, Eli Rosh-Hodesh, Arie Zaban
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73 Evolution of Crystallographic Texture during Cold Rolling of Novel Magnesium Alloys

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74 3D Fabrics as Reinforcement for Cement-based Composites

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75 Hydrogen Transport in HAVAR

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76 Towards Construction of Quasi-binary UAl_3 - USi_3 Phase Diagram

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77 Study of the $U(Al,Si)_3$ Vertex Location in the 400°C Isothermal Section of the U-Al-Si Phase Diagram

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78 Processing Conditions and Microstructure of SiC-AlN Solid Solutions

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79 Characterization of Explosion Welded Ti-Steel Joints

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80 The Role of Palladium in the W-Cr-Pd Alloy

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81 High-Entropy Alloys for Aerospace Applications

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82 Microstructure and Properties of Aged Vs Crept Mg-Al-Zn-Sn+Nd/Ce

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83 Archaeometallurgical Study of Tantura F Shipwreck's Anchor B

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Electronic Materials and Thin Films

1 GaAs-Based Virtual Substrates for Growth of InAsSb Photodetectors

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2 Enabling Long-Term Operation of GaAs Based Sensors in Aqueous Solutions

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3 Preparation, Application and Characterization of a ReRAM Type Nonvolatile Memory Device Made of Nanoparticles' Oxide Layer

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4 The Evolution of Ultra-thin Co(W,P) Film Growth During Electroless Plating on Titanium-Nitride Surface Modified by Self-assembled Monolayer

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5 Memory Diodes with Nonzero Crossing

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6 Oxygen Doping of TiS₂ Nanoribbons

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7 The Effect of Post Oxide Thermal Treatment on the Properties of Metal/Al₂O₃/InGaAs Capacitors

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8 Production of $\text{MnSi}_{1.7}$ Thin Films by Magnetron Sputtering Codeposition

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9 Epitaxial Growth of Vanadium Dioxide Using a Novel High-temperature-lift-off Process

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10 Performances Enhancement of MIM Nitride Capacitor via Optimization of Process Gas Ratios and Deposition Rate

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11 Role of the Interface in the Degradation of Metal / Al_2O_3 / n-InGaAs Capacitors

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12 Band Gap Opening in Graphene Oxides

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13 A Comparative Study of the Structure and Optical Properties of Copper Sulfide Thin Films Chemically Deposited on Various Substrates

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14 Evanescent Light Measurements in Palladium Thin Layers

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Computational Materials

15 Simulated Doping of Si from First Principles Using Pseudo-Atoms

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16 Thermodynamic Modeling of Some Al-U-X Ternary Systems

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17 Molecular Dynamics Simulations of Dislocation Dynamics

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18 Implementation of Computational Platforms in the Studies of Materials Engineering

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19 First-principles Calculations of Electronic Transport and Lattice Dynamics of the Thermoelectric Compound PbTe

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20 A New Material's Experiment: Data Mining for Modeling and Creation of Knowledge Base

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21 Modeling the Effect of Adsorbed Polyelectrolytes on the Potential of Charged Particles for Electrophoretic Deposition

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22 The Electrostatic Double Layer of Pt/water Interfaces from First Principles Molecular Dynamics

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Physics and Chemistry of Materials

23 Some Features on the Electrosynthesis of Nanostructured Nb₂O₅ Anodic Films

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24 Micro-refinement of Al-Si Alloys Melt in the Sand Casting Process Using Barium and Grain Refiner Additions

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25 Electron Transport in Solids – Inelastic Mean Free Path Measurements in the 5 to 15 keV Energy Range

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26 Development of Lead Chalcogenides Based Doped with Chalcogenide Elements for Thermoelectric Applications

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27 Structure and Energy of Equilibrated Ni-YSZ Solid-Solid Interface

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28 A Comparison between the Effects of Sb and Bi Doping on the Thermoelectric Efficiency of Spark Plasma Sintered Half-Heusler Alloy

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29 BCC Stability in the Eam Inter-Atomic Potential

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30 Thermoelectric Properties Improvement of n-type (Bi₂Te₃)_{1-x}(Bi₂Se₃)_x (0.2 ≤ x ≤ 0.4) Alloys by Nano-feature Formation

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31 Thermal Activation of Sol-gel Hybrid Materials

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32 Structure and Temperature Invariance of Sound Velocity in Supercooled Bismuth Melt

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33 Pressure Dependence of Solution Interaction Parameters in Alloys from Sound Velocity Measurements

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75

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Marketing Manager: Ron Ariel

Contact Person: Benny Hayumi, VP Operations

Represented Companies: ATV, Beneq, Intest, Sonotek, Headway Research, Digit Concept, Ultratec USA, Nordson March, Femto Tools, SI-Tech, Ioni Tech, Inter Test, Process Materials

Products & Services Offered:

Failure Analysis: Decapsulation, Sample Prep.
Environmental Thermal Forcing Systems
Coating: Vacuum, Ultrasonic Spray, ALD
Ovens/Furnaces: Vacuum, RTP, Getter, Reflow
Full Technical Advice And Service Support.

SHL-Alubin Ltd.

37 Yosef Levi St., POB 1188

27112 Kiriath Bialik, Israel

Tel. 972-4-8787070

Fax. 972-4-8761160

Email: amir@alubin.com

www.alubin.com

General Manager: Gal Segal

Marketing Manager: Amir Gilad

Contact Person: Amir Gilad, Sales Manager

Represented Companies: S.H.L.-Alubin

Products & Services Offered:

SHL-Alubin is the largest aluminum and magnesium profiles manufacturer in Israel.

We are developing and producing custom made shapes of aluminum and magnesium extruded profiles. Including die production, painting, anodize coating and ceramic on metal for magnesium profiles. All in house.

Sigma Aldrich

3 Plaut St., 7670603 Rehovot, Israel

Tel. 972-8-9484100

Fax. 972-8-9484200

Email: Israel@sial.com

www.sigmaaldrich.com

General Manager: Dr. Arie Mayer

Marketing Manager: Lawrence Hassner

Contact Person: Anat Hemell, Marketing Specialist

Represented Companies: Sigma, Aldrich, Fluka, Supelco, Sigma-Aldrich

Products & Services Offered: Sigma-Aldrich Israel Ltd. is a subsidiary of the Sigma-Aldrich Corporation and a leading life science and high technology company. Supelco provides products for analysis and purification and chromatography.

Tirosh David Quality Casting Ltd.

Hamelacha 17A, 4809145 Rosh Haa'yin
Israel

Tel. 972-3-9024415

Fax. 972-3-9024390

Email: roy.o@tirosh-casting.com

www.tirosh-casting.com

General Manager: Roy Offir

Marketing Manager: Roy Offir

Contact Person: CEO

Products & Services Offered: Aluminum Sand Casting and Machinery

TowerJazz

Ramat Gavriel Industrial Park

20 Shaul Amor Ave.

POB 619, 23105 Migdal Haemek
Israel

Tel. 972-4-6047249

Email: limorsi@towersemi.com

www.towerjazz.com

Marketing Manager: Noit Levi

Contact Person: Limor Silberberg
PR & MarCom Israel and Europe

V.S.T. (Services) Ltd.

19 Imber St., 4951153 Petach Tikva
Israel

Tel. 972-3-9247710

Fax. 972-3-9247711

Email: angel@vstser.com

www.vacuumltd.com

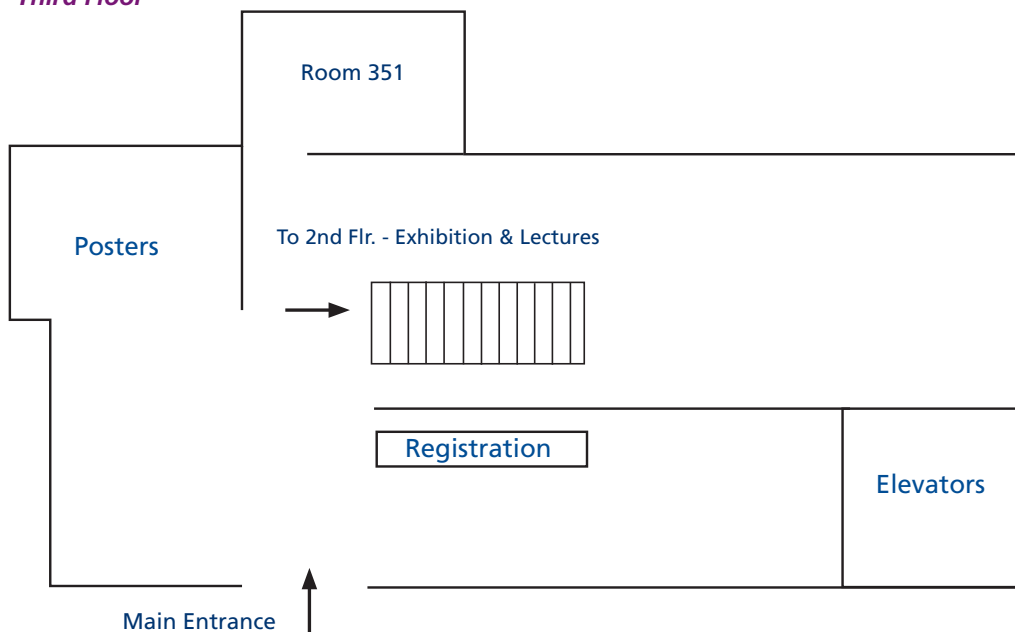
Contact Person: Angel Hershko

Vice President & Marketing Manager

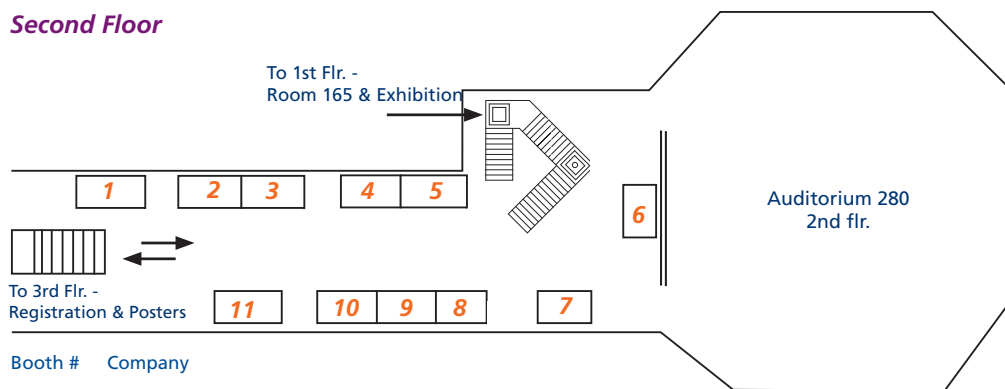
Products & Services Offered:

- Design and manufacture of Thin Film Deposition Systems and Vacuum Ovens.
- Marketing and Service of Equipment and Instrumentation for the Semiconductor, Optics and Electro-Optics Industries.

Third Floor



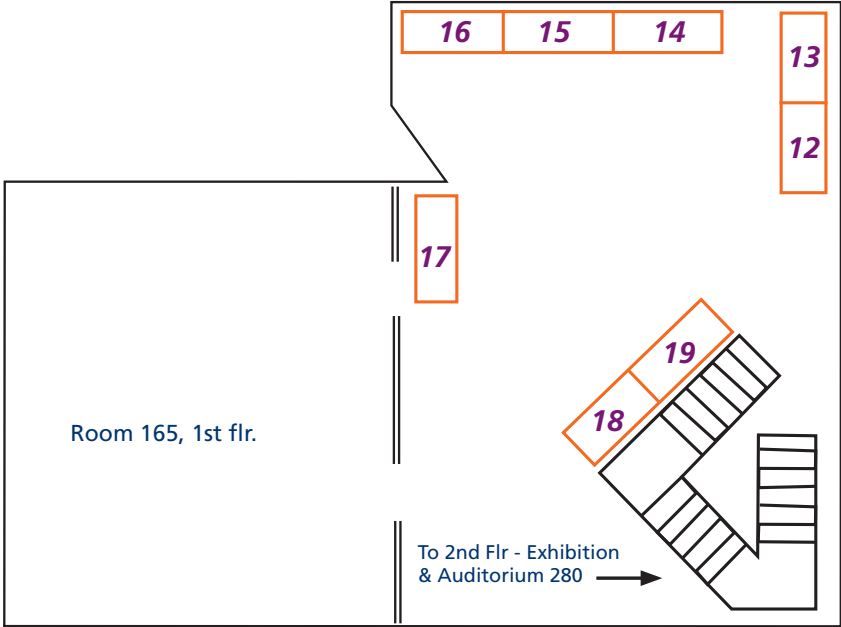
Second Floor



Booth # Company

1	Segen Technologies	7	Ham-Let
2	New Road	8	KLA-Tencor Israel
3	Jordan Valley Semiconductors	9	Dr. Golik & Quantachrome
4	Odem	10	Rhenium
5	Vacuum Systems	11	Medi-Fischer Engineering & Science
6	Eisenberg Bros.		

First Floor



Booth #	Company		
12	Sigma Aldrich	16	Itec
13	PicoTech	17	BioAnalytics
14	Ammo Engineering	18	Eldan Neopharm Group
15	Meteo-Tech, Analyser Devices	19	Agentek

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Conference Secretariat



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