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4. TITLE AND SUBTITLE Final Report: 2015 Materials Research Society Spring Meeting			5a. CONTRACT NUMBER W911NF-15-1-0106		
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			5c. PROGRAM ELEMENT NUMBER 611102		
6. AUTHORS Jay Narayan, J. Ardie Dillen			5d. PROJECT NUMBER		
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			5f. WORK UNIT NUMBER		
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13. SUPPLEMENTARY NOTES The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other documentation.					
14. ABSTRACT The 2015 Materials Research Society Spring Meeting was held April 6-10 in San Francisco, CA. The scientific sessions included many emergent areas of materials research as well as some well-established ones. The frequent occurring overlap of topics among the various clusters is a manifestation of the inter- and cross-disciplinary of contemporary materials science and engineering. Symposium FF brought together materials scientists with expertise in synthesis and processing, characterization of defects and interfaces, structure-property correlations and modeling to address critical issues in novel semi-conductor structures needed for next generation systems. These					
15. SUBJECT TERMS Defects in Semiconductors, Optoelectronic Properties, Bio-Nano Interfaces, Synthesis, Modeling					
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a. REPORT UU	b. ABSTRACT UU	c. THIS PAGE UU			19b. TELEPHONE NUMBER 724-779-2711

Report Title

Final Report: 2015 Materials Research Society Spring Meeting

ABSTRACT

The 2015 Materials Research Society Spring Meeting was held April 6-10 in San Francisco, CA. The scientific sessions included many emergent areas of materials research as well as some well-established ones. The frequent occurring overlap of topics among the various clusters is a manifestation of the inter- and cross-disciplinary of contemporary materials science and engineering. Symposium FF brought together materials scientists with expertise in synthesis and processing, characterization of defects and interfaces, structure-property correlations and modeling to address critical issues in novel semi-conductor structures needed for next-generation systems. These systems include microelectronic and optoelectronic devices and smart sensors which are of critical importance to the needs of US Army. Research reported in Symposium GG supports the development of new intelligence systems, biologically strong and lightweight materials, advanced electronics, and sustainable catalysts.

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

<u>Received</u>	<u>Paper</u>
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TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

<u>Received</u>	<u>Paper</u>
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TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 153.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received Book

TOTAL:

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Names of Faculty Supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Names of Under Graduate students supported

<u>NAME</u>	<u>PERCENT SUPPORTED</u>
FTE Equivalent:	
Total Number:	

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

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The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

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The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields: 0.00

Names of Personnel receiving masters degrees

NAME

Total Number:

Names of personnel receiving PHDs

NAME

Total Number:

Names of other research staff

NAME

PERCENT SUPPORTED

FTE Equivalent:

Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

Symposia FF and GG summaries and programs are included in the attached document.

Technology Transfer

Symposia FF and GG summaries and programs are attached.

Final report for ARO Grant W911NF-15-1-0106

Symposium FF, Defects in Semiconductors: Relationship to Optoelectronic Properties
<http://www.mrs.org/spring-2015-program-ff/>

Organizers

Zuzanna Liliental-Weber, Lawrence Berkeley National Laboratory, Berkeley, CA 94720

Yong Chen, University of California, Los Angeles CA 90095

Jay Narayan, North Carolina State University, Raleigh, NC 27695

Eicke R. Weber, Fraunhofer Institute for Solar Energy Systems, Freiburg, Germany

Symposium Highlights:

The symposium highlighted the role of defects in controlling the electronic, magnetic and optical properties, which are critical to device performance. The correlations between atomic structure and properties were shown to play a very important role and reliability of nanoscale devices. The following talk was included in the MRS Meeting Scene e-Newsletter:

The Impact of Trench Defects in InGaN/GaN Light Emitting Diodes and Implications for the “Green Gap” Problem (Fabien Massabuau, University of Cambridge)

Trench defects are a commonly occurring flaw in InGaN/GaN quantum well (QWs) structures, where a region of material is enclosed by a V-shaped trench, but the impact of trench defects on light-emitting diodes (LEDs) has been largely overlooked, leading Fabien Massabuau and his collaborators to design experiments that revealed a high density of trench defects lowers green LED efficiency. InGaN/GaN QW structures grown by metalorganic vapor phase epitaxy increased trench defect density with different trimethylindium (TMI) fluxes, with up to a 10-fold increase in trench defect density. Two LED structures were grown under identical conditions as the initial QW structures with a p-doped GaN layer deposited on top of the QWs. High angle annular dark field scanning transmission electron microscopy revealed active region degradation during the growth and anneal of the p-doped GaN layer. Samples grown with five QWs grown at a temperature ranging from 690°C to 780°C and with no p-GaN deposited, exhibited a two decade increase in the density of trench defects between blue- and green-emitting QW structures, resulting in (45 ± 2) % of the surface of the green-emitting structure being covered by trench defects, implying that the efficiency of green-emitting LEDs is strongly affected by the presence of trench defects. Their results mirror the model that the "green gap" problem relates to localized strain relaxation occurring from defects.

Future Directions:

As devices are getting smaller, a better control of defects will play a critical role. In addition, if these defects can be made stable, they can be used to play an active useful role, as opposed to detrimental role.

Grant Expenditures:

ARO Grant funds (\$4K total) were used to provide partial support for meeting travel and registration for selected invited speakers.

About the MRS Symposium

This symposium brought together materials scientists with expertise in synthesis and processing of semiconductors, characterization of defects and interfaces, structure-property correlations and modeling to address critical issues in energy related materials needed for next-generation systems. With increasing demands of energy consumption, development of new renewable energy technologies is a necessary step to drastically reduce carbon emission from fossil fuels. Materials hold the key to advanced renewable energy technologies including solar cells, batteries, fuel cells, and catalysis. Semiconductor materials including oxides can provide future high efficiency sources of visible light, visual displays, photovoltaic energy conversion devices and of a large variety of sensors and power control systems for energy generation, conservation, and distribution. Furthermore, characteristics of defects and their control in these materials are crucial for the performance, reliability, and lifetime of energy related devices and systems. For example, among renewable energy technologies, solar energy is a limitless source of energy, and photovoltaic energy conversion is one of the most efficient ways to produce electricity directly from the Sun. The key issue there is to further reduce the cost of photovoltaic energy conversion. Cost reduction of PV can be achieved through reduction of material cost and/or improvement in conversion efficiency.

Defects play a crucial role in limiting the present technologies to realize the predicted high efficiency of these devices. Therefore, understanding the relationships between the fundamental electronic structure, the presence of particular structural defects and/or dopants, and the electrical, magnetic, and optical properties is a necessary step in the development of high efficiency solar energy related materials. Control of these defects determines the commercial viability of a given new material or structure. By varying crystal growth and processing conditions, the effects of defects: dopants, line and planar defects and impurities at surfaces, interfaces and in the bulk can be investigated. The influence of these defects on the properties of the particular devices can be demonstrated.

Although extended defects are generally detrimental for device performance in conventional thin-film and bulk materials, point defects and some extended defects can in some cases be controlled, particularly at the nanoscale, such that device performance is enhanced. Point defects can impart useful electrical and magnetic properties and enhance functionalities of solid state devices. Selective doping as well as internal surfaces and interfaces that confine electronic carriers or alter scattering rates of phonons that can be engineered to produce nanostructured materials whose performance cannot be duplicated in conventional materials.

The focus of this symposium was on the identification, manipulation, and elimination of various defects in energy related materials. These defects can be formed during material growth or introduced via various methods during device processing that relate to and influence particular electrical and/or optical properties of materials.

The first day of the Symposium was devoted to the memory of Professor Jack Washburn who passed away at the age of 92 in October 2013. His teaching and research at UC Berkeley and the Lawrence Berkeley National Laboratory provided a fundamental basis for the understanding of defects in semiconductors, particularly interplay between point defects, dislocations and planar defects. It should be noted that defects in semiconductors and their control through laser-solid interactions and transient thermal processing were critical to the highly successful launch of the Materials Research Society, as evidenced by the series of early symposia on these topics.

A partial list of invited speakers included:

T. Sands-Virginia Tech
Subhash Mahajan-UC Davis
K.M. Yu-Lawrence Berkeley Laboratory,
I. Tischer-University of Ulm, Germany
Chris Van de Walle -UC Santa Barbara
Su-Huai Wei -NREL
Yanfa Yan -University of Toledo, OH
H. Amano-Nagoya University, Japan
S. Pantelides-Vanderbilt
Maria Varela- Oak Ridge National Laboratory;
Yimei Zhu - Brookhaven National Lab

Symposium Participants supported with ARO funds:

Mourad Benamara, University of Arkansas
Yong Chen, UCLA
Maribel Jaquez, UC-Berkeley
Chris Van de Walle, UC-Santa Barbara
Yanfa Yan, University of Toledo
Tonio Buonassisi, MIT
Roberto dos Reis, LBNL
Sokrates Pantelides, Vanderbilt University

MRS ONLINE PROCEEDINGS LIBRARY ARCHIVE - 2015 - VOLUME 1792

Effects of Electrical Stress and High-Energy Electron Irradiation on the InGaP/GaAs Heterojunction Phototransistor
Phuc Hong Than and Kazuo Uchida and Takahiro Makino and Takeshi Ohshima and Shinji Nozaki

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2125479](#)

doi: 10.1557/opl.2015.403, Published online by Cambridge University Press 11 May 2015

Electrical Characteristics of RF Sputtered ZnO/HfO₂ Interfaces in Transparent Thin Film Transistors
Prem Thapaliya and Wenchao Lu and Rashmi Jha

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2137545](#)

doi: 10.1557/opl.2015.648, Published online by Cambridge University Press 24 Jun 2015

The Influence of Thermal Treatment on Monocrystalline CZT and Tellurium Inclusions
Jonathan Lassiter and Charles Payton and Maxx Jackson and Samuel Uba and Claudiu Muntele and Stephen Babalola

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2136240](#)

doi: 10.1557/opl.2015.448, Published online by Cambridge University Press 12 May 2015

Space Environments and Effects on CIGS Solar Cells and Modules
Shirou Kawakita and Mitsuru Imaizumi and Hiroaki Kusawake

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2148479](#)

doi: 10.1557/opl.2015.435, Published online by Cambridge University Press 14 May 2015

Reliability Detection of Process-Induced Metallization Defects in GaAs Devices
Steve H. Kilgore

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2132530](#)

doi: 10.1557/opl.2015.472, Published online by Cambridge University Press 18 May 2015

Physical Mechanisms Affecting the Reliability of GaN-based High Electron Mobility Transistors
R. D. Schrimpf and D. M. Fleetwood and S. T. Pantelides and Y.S. Puzryev and S. Mukherjee and R. A. Reed and J. S. Speck and U. K. Mishra

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2147627](#)

doi: 10.1557/opl.2015.475, Published online by Cambridge University Press 18 May 2015

White beam X-ray Diffraction Topography (WBXDT) Studies of Bridgman Grown CdZnTe Crystals
Stephen Babalola and Samuel Uba and Anwar Hossain and Giuseppe Camarda and Ralph James and Trent Montgomery

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2134972](#)

doi: 10.1557/opl.2015.510, Published online by Cambridge University Press 22 May 2015

Impact of low dose gamma irradiation on electronic carrier transport in AlGaIn/GaN High Electron Mobility Transistors
Anupama Yadav and Elena Flitsiyan and Leonid Chernyak and Fan Ren and Stephen J. Pearton and Jerry Wayne Johnson and Igor Lubomirsky

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2137760](#)

doi: 10.1557/opl.2015.511, Published online by Cambridge University Press 22 May 2015

Large Persistent Photoconductivity in Strontium Titanate at Room Temperature
Violet M. Poole and J. Dashdorj and Mary Ellen Zvanut and Matthew D. McCluskey

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2090706](#)

doi: 10.1557/opl.2015.531, Published online by Cambridge University Press 28 May 2015

Characterization of Extended Defects Observed in Cadmium Zinc Telluride (CZT) Crystal
Samuel Uba and Stephen Babalola and Anwar Hossain and Ralph James

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2134263](#)

doi: 10.1557/opl.2015.535, Published online by Cambridge University Press 28 May 2015

Ordering of InGaAs Quantum Dots Grown by Molecular Beam Epitaxy under As₂ gas flux
Mourad Benamara and Yuriy I. Mazur and Peter Lytvyn and Morgan E. Ware and Vitaliy Dorogan and Xian Hu and Leonardo D. de Souza and Euclides Marega and Marcio Theodores and Gilmar Marques and Greg Salamo

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2134709](#)

doi: 10.1557/opl.2015.537, Published online by Cambridge University Press 28 May 2015

MRS ONLINE PROCEEDINGS LIBRARY ARCHIVE - 2015 - VOLUME 1792

Reliability and Degradation Mechanisms in High Power Broad-Area InGaAs-AlGaAs Strained Quantum Well Lasers

Yongkun Sin and Nathan Presser and Stephen LaLumondiere and Miles Brodie and Zachary Lingley and Neil Ives and Brendan Foran and William Lotshaw and Steven C. Moss

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2130709](#)

doi: 10.1557/opl.2015.534, Published online by Cambridge University Press 28 May 2015

Relevance of Threading Dislocations for the Thermal Oxidation of GaN (0001)

Maria Reiner and Christian Koller and Kurt Pekoll and Rudolf Pietschnig and Clemens Ostermaier

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2133138](#)

doi: 10.1557/opl.2015.557, Published online by Cambridge University Press 01 Jun 2015

Mechanical and Optical Properties Characterization of C-Plane (0001) and M-Plane (10-10) GaN by Nanoindentation and Luminescence

Toshiya Yokogawa and Masaki Fujikane and Shijo Nagao and Roman Nowak

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2127895](#)

doi: 10.1557/opl.2015.592, Published online by Cambridge University Press 11 Jun 2015

Study of Photoluminescence Properties of Cu_xO Thin Films Prepared by Reactive Radio Frequency Magnetron Sputtering

Jiantuo Gan and Augustinas Galeckas and Vishnukanthan Venkatachalapathy and Heine N. Riise and Bengt G. Svensson and Edouard V. Monakhov

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2135334](#)

doi: 10.1557/opl.2015.596, Published online by Cambridge University Press 11 Jun 2015

Selectively Nucleated Lateral Crystallization for a Large Single-Grained Pb(Zr,Ti)O₃ on Polycrystalline-Silicon Thin-Film Transistors for System-On-Glass Applications

Jae Hyo Park and Seung Ki Joo

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2134971](#)

doi: 10.1557/opl.2015.610, Published online by Cambridge University Press 16 Jun 2015

Evolution of Structural and Optical Properties on PIN and NIP pm-Si:H Devices During 400 Hrs of Light-Soaking

Leon Hamui and Pere Roca i Cabarrocas and Guillermo Santana

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2138457](#)

doi: 10.1557/opl.2015.613, Published online by Cambridge University Press 16 Jun 2015

Reliability Study of Organic Light-emitting Diodes by Continuous-wave and Pulsed Current Stressing

X. M. Li and R. Acharya and Y. Q. Zhang and X. A. Cao

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2128645](#)

doi: 10.1557/opl.2015.609, Published online by Cambridge University Press 16 Jun 2015

Modeling of CZT Response to Gamma Photons Using MCNP and Garfield

Jonathan Lassiter and Randy Robinson and Latressa Williams and Stephen Babalola and Claudiu Muntele

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2137042](#)

doi: 10.1557/opl.2015.628, Published online by Cambridge University Press 19 Jun 2015

Temperature induced degradation of InAlGa_N multiple-quantum well UV-B LEDs

Johannes Glaab and Christian Ploch and Rico Kelz and Christoph Stölmacker and Mickael Lapeyrade and Neysha Lobo Ploch and Jens Rass and Tim Kolbe and Sven Einfeldt and Frank Mehnke and Christian Kuhn and Tim Wernicke and Markus Weyers and Michael Kneissl

[MRS Online Proceedings Library Archive, Volume 1792, 2015, mrss15-2102646](#)

doi: 10.1557/opl.2015.446, Published online by Cambridge University Press 12 May 2015





Home >

Program: Symposium FF—Defects in Semiconductors—Relationship to Optoelectronic Properties



2015 MRS Spring Meeting & Exhibit

April 6-10, 2015

San Francisco, California

2015-04-07

Symposium FF

[Show All Abstracts](#)

Symposium Organizers

- Yong Chen, Univ of California, Los Angeles
- Zuzanna Liliental-Weber, Lawrence Berkeley National Laboratory
- Jagdish Narayan, North Carolina State University
- Eicke Weber, Fraunhofer ISE

Support

- Fraunhofer-Institut für Solare Energiesysteme ISE
- Lawrence Berkeley National Laboratory
- Materials Science Department UC Berkeley
- University of Texas at Austin

FF1:Structure-Property-Relationship I (In Memory of Prof. J. Washburn)

- Chair: Z Liliental-Weber
- Tuesday AM, April 7, 2015
- Moscone West, Level 3, Room 3016

8:15 AM - *FF1.01

Professor Jack Washburn Memorial Contributions

Mark Asta¹.

1, Department of Materials Science and Engineering, University of California, Berkeley, California, United States.

Show Abstract

8:45 AM - *FF1.02

Metal/Semiconductor Superlattices ... at Last

Timothy Sands¹, Bivas Saha³.

1, Department Electrical & Computer Engineering, Virginia Tech, Blacksburg, Virginia, United States; 2, Department of Materials Science and Engineering, Virginia Tech, Blacksburg, Virginia, United States; 3, Department of Materials Science and Engineering, University of California, Berkeley, Berkeley, California, United States.

Show Abstract

9:15 AM - FF1.03

Interplay of Structural and Optical Properties in CdO

Augustinas Galeckas¹, Vishnukanthan Venkatachalapathy¹, Andrej Kuznetsov¹.

1, Department of Physics/ Centre for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway.

Show Abstract

9:30 AM - FF1.04

Temperature Driven Three-Dimensional Ordering of InGaAs/GaAs Quantum Dot Superlattices Grown Under As₂ Gas Flux

Mourad Benamar¹, Yuriy Mazur¹, Peter Lytvyn², Morgan E. Ware¹, Vitaliy Dorogan¹, Leonardo D. de Souza⁴, Euclides Marega³, Marcio Theodores⁴, Gilmar Marques⁴, Greg Salamo¹.

1, Institute for Nanoscience & Engineering, University of Arkansas, Fayetteville, Arkansas, United States; 2, NAS of Ukraine, USAbV. Lashkaryov Institute of Semiconductor Physics, Kyiv, Ukraine; 3, Instituto de Física de São Carlos, Universidade Federal de São Carlos, São Carlos, Brazil; 4, Departamento de Física, Universidade Federal de São Carlos, São Carlos, Brazil.

Show Abstract

9:45 AM -

BREAK

Show Abstract

10:15 AM - *FF1.05

Structural and Optical Properties of Dislocations in III-Nitrides

Martin Albrecht¹, Liverios Lymperakis², Joerg Neugebauer².

1, Elektronenmikroskopie, Leibniz-Institut fuer Kristallzuechtung, Berlin, Germany; 2, Computational Materials, Max-Planck-institut fuer Eisenforschung, Düsseldorf, Germany.

Show Abstract

10:45 AM - FF1.06

Segregation of In to Dislocations in InGaN

Matthew Horton¹, Sneha Rhode², Suman-Lata Sahonta², Menno Kappers², Sarah Haigh³, Timothy Pennycook⁴, Colin Humphreys², Michelle Moram¹.

1, Imperial College London, London, United Kingdom; 2, Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, United Kingdom; 3, School of Materials, University of Manchester, Manchester, United Kingdom; 4, SuperSTEM, STFC Daresbury Laboratories, Warrington, United Kingdom; 5, Department of Materials, University of Oxford, Oxford, United Kingdom.

Show Abstract

11:00 AM - FF1.07

Direct Observation of Wavelength Shift in the V-Defects in GaN/InGaN Multi-Quantum Well Structure using Cathodoluminescence in Transmission Electron Microscopy

Young-Woon Kim¹, Mi-Hyang Sheen¹, Jong Hwan Lee¹.

¹, Seoul National University, Seoul, Korea (the Republic of).

Show Abstract

11:15 AM - FF1.08

The Impact of Trench Defects in InGaN/GaN Light Emitting Diodes and Implications for the “Green Gap” Problem

Fabien Massabuau¹, Matt Davies², Fabrice Oehler¹, Sarah Pamentier¹, Ted Thrush¹, Menno Kappers¹, Andras Kovacs³, Tim Williams⁴, Margareth Hopkins⁵, Colin Humphreys¹, Phil Dawson², Rafal Dunin-Borkowski³, Joanne Etheridge⁴, Duncan Allsopp⁵, Rachel Oliver¹.

¹, University of Cambridge, Cambridge, United Kingdom; ², University of Manchester, Manchester, United Kingdom; ³, Forschungszentrum, Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons, Jülich, Germany; ⁴, Monash Centre for Electron Microscopy, Monash, Victoria, Australia; ⁵, University of Bath, Bath, United Kingdom.

Show Abstract

11:30 AM - *FF1.09

Optical Properties of Defects in Nitride Semiconductors

Ingo Tischer¹, Matthias Hocker¹, Manfred Madel¹, Benjamin Neuschl¹, Manuel Knab¹, Manuel Frey¹, Thomas Wunderer², Robert A.R. Leute³, Junjun Wang³, Ferdinand Scholz³, Johannes Biskupek⁴, Jörg Bernhard⁴, Ute Kaiser⁴, Levin Dieterle⁵, Heiko Groiss⁵, Erich Müller⁵, Dagmar Gerthsen⁵, Klaus Thonke¹.

¹, Institute of Quantum Matter, Semiconductor Physics Group, University of Ulm, Ulm, Germany; ², PARC, Palo Alto, California, United States; ³, Institute of Optoelectronics, University of Ulm, Ulm, Germany; ⁴, Electron Microscopy Group of Materials Science, University of Ulm, Ulm, Germany; ⁵, Laboratory for Electron Microscopy, Karlsruhe Institute of Technology, Karlsruhe, Germany; ⁶, Institute of Semiconductor and Solid State Physics, Johannes Kepler University Linz, Linz, Austria.

Show Abstract

FF2: Structure-Property-Relationship II (In Memory of Prof. J. Washburn)

- Chair: Timothy Sands
- Tuesday PM, April 7, 2015
- Moscone West, Level 3, Room 3016

1:30 PM - *FF2.01

The Role of Defects on CdTe Solar Cell Efficiency

Stephen Pennycook¹, Chen Li², Jonathan Poplawsky³, Naba Paudel⁴, Mowafak Al-Jassim⁵, Yanfa Yan⁶.

¹, University of Tennessee, Knoxville, Tennessee, United States; ², University of Vienna, Vienna, Austria; ³, Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States; ⁴, University of Toledo, Toledo, Ohio, United States; ⁵, National Renewable Energy Laboratory, Golden, Colorado, United States; ⁶, The University of Toledo, Toledo, Ohio, United States.

Show Abstract

2:00 PM - FF2.02

o+2 - A First Principles Study of Interactions Among Point Defects and Grain Boundaries in CdTe

Fatih G Sen², Christopher Buurma³, Tadas Paulauskas³, Ce Sun¹, Moon Kim¹, Robert Klie³, Maria K Chan².

1, , Univ of Texas-Dallas, Richardson, Texas, United States; 2, , Argonne National Laboratory, Argonne, Illinois, United States; 3, , University of Illinois at Chicago, Chicago, Illinois, United States.

Show Abstract

2:15 PM - FF2.03

Characterization of Extended Defects Observed in Cadmium Zinc Telluride (CZT) Crystals

Samuel Uba¹, Stephen Oluseyi Babalola¹, Anwar Hossain², Ralph B. James², Trent Montgomery¹.

1, , Alabama A&M University, Huntsville, Alabama, United States; 2, , Brookhaven National Laboratory, Upton, New York, United States.

Show Abstract

2:30 PM - FF2.04

Simulation of the Compensation of Defects in CdTe during Slow Cooling

Dmitry Krasikov², Andrey Knizhnik², Boris Potapkin², Aharon Yakimov¹.

1, , GE Global Research Ctr, Niskayuna, New York, United States; 2, , Kintech Lab Ltd., Moscow, Russian Federation.

Show Abstract

2:45 PM -

BREAK

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3:15 PM - *FF2.05

Optical and Structural Nano-Characterization of Extended Defects in III-Nitrides by Low Temperature Scanning Transmission Electron Microscopy Cathodoluminescence

Juergen H. Christen¹.

1, , Otto-von-Guericke-University Magdeburg, Magdeburg, Germany.

Show Abstract

3:45 PM - FF2.06

Tailoring the Optical Characteristic of ZnO Nanowires by Using Different Substrates

Caroline Ines Lisevski Sombrio², Roberto M S dos Reis¹, Paulo L Franzen³, Henri I Boudinov³, Daniel Lorscheitter Baptista³.

1, , National Center for Electron Microscopy/Molecular Foundry, Berkeley, California, United States; 2, , Univ Federal-Rio Grande do Sul, Porto Alegre, Brazil; 3, Instituto de Fisica, UFRGS, Porto Alegre, RS, Brazil.

Show Abstract

4:00 PM - FF2.07

Energy Up-Converted Auger Process of Three Donor-Acceptor Pairs to Two Free Excitons (3 D-A pairs to 2 e-h excitons) Associated with Deep Hole Trap in GaN

Katsushi Fujii¹, Takenari Goto², Takafumi Yao³.

1, GS+I, The University of Tokyo, Tokyo, Tokyo, Japan; 2, , RIKEN, Wako, Saitama, Japan; 3, , AIST, Tsukuba, Ibaraki, Japan.

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4:15 PM - FF2.08

Electrical Conduction Along Dislocations Freshly Induced into GaN by Plastic Deformation

Ichiro Yonenaga¹, Keiichi Edagawa².

1, , Tohoku University, Sendai, Japan; 2, , University of Tokyo, Tokyo, Japan.

Show Abstract**4:30 PM - FF2.09**

Mechanical and Optical Properties Characterization of c-Plane (0001) and m-Plane (10-10) GaN by Nanoindentation and Luminescence

Toshiya Yokogawa¹, Masaki Fujikane², Sijo Nagao³, Roman Nowak⁴.

1, , Yamaguchi University, Ube, Japan; 2, , Panasonic, Moriguchi, Japan; 3, , Osaka University, Osaka, Japan; 4, , Aalto University, Aalto, Finland.

Show Abstract**4:45 PM - FF2.10**

Multi-Microscopy Investigation of the Optical Properties of Dislocations in InGaN

Fabien Massabuau¹, Peiyu Chen¹, Tom O'Hanlon¹, Chris Ren¹, Sneha Rhode¹, Andras Kovacs², Menno Kappers¹, Colin Humphreys¹, Rafal Dunin-Borkowski², Rachel Oliver¹.

1, , University of Cambridge, Cambridge, United Kingdom; 2, Forschungszentrum, Ernst Ruska-Centre for Microscopy and Spectroscopy with Electrons, Jülich, Germany.

Show Abstract**2015-04-08****Symposium FF****Show All Abstracts****Symposium Organizers**

- Yong Chen, Univ of California, Los Angeles
- Zuzanna Liliental-Weber, Lawrence Berkeley National Laboratory
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FF3: The Role of Defects in Optoelectronic Properties of Nitrides

- Chair: Juergen Christen
- Wednesday AM, April 8, 2015
- Moscone West, Level 3, Room 3016

8:15 AM - *FF3.01

Acceptor States and Defects in Mg-Doped Homoepitaxial GaN

Bo A. Monemar^{1 2 3}.

1, IFM, Linköping University, Linköping, Sweden; 2, Solid State Physics, Lund University, Lund, Sweden; 3, Global Innovation and Research Organization, Tokyo University of Agriculture and Technology, Tokyo, Japan.

Show Abstract

8:45 AM - FF3.02

How to Deactivate Harmful Defects and Active them for New Spin Functionalities in a Semiconductor?

Weimin M. Chen¹, I A Buyanova¹, Y Puttisong¹, X J Wang¹, C W Tu², A J Ptak³, L Geelhaar⁴, H Riechert⁴.

1, , Linköping University, Linköping, Sweden; 2, , University of California, La Jolla, California, United States;
3, , National Renewable Energy Lab, Golden, Colorado, United States; 4, , Paul-Drude-Institut für
Festkörperelektronik, Berlin, Germany.

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9:15 AM - *FF3.04

Properties of State of the Art of Ammonothermal and Hydride Vapor Phase Epitaxial GaN Substrates

Jaime A. Freitas¹, Nadeemullah Mahadik¹, James Culbertson¹, Tomasz Sochacki², Michal Bockowski².

1, , Naval Reserach Laboratory, Washington, District of Columbia, United States; 2, , UNIPRESS, Wasaw, Poland.

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9:45 AM - FF3.05

Spectroelectrochemical Studies on the Defect-Related Photoluminescence from ZnO Nanocrystals

Peter Andreas Schulze¹, Carlos Burga¹, Michael Bartl¹.

1, Dept of Chemistry, Univ of Utah, Salt Lake City, Utah, United States.

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10:00 AM -

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10:30 AM - *FF3.06

Impact of Point Defects on Efficiency of Nitride Light Emitters

Chris G. Van de Walle¹.

1, , University of California, Santa Barbara, Santa Barbara, California, United States.

Show Abstract

11:00 AM - FF3.07

Studies of Gamma-Irradiation Induced Effect on Electronic Carrier Transport Properties of AlGa_N/Ga_N High Electron Mobility Transistors

Anupama Yadav¹, Elena Flitsyan¹, Leonid Chernyak¹, Igor Lubomirsky².

1, Department of Physics, University of Central Florida, Orlando, Florida, United States; 2, Materials & Interfaces, Weizmann Inst of Science, Rehovot, Israel.

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11:15 AM - *FF3.08

Structural and Optical Properties of Highly Mismatched GaN_{1-x}Sb_x Alloys

Kin Man Yu¹ 2, Sergei V. Novikov³, Min Ting⁴ 2, W.L. Sarney⁶, S.P. Svensson⁶, Martin Shaw⁷, R.W. Martin⁷, Wladyslaw Walukiewicz⁵, C. T. Foxon³.

1, , City University of Hong Kong, Kowloon, Hong Kong; 2, Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California, United States; 3, , School of Physics and Astronomy, University of Nottingham, Nottingham, United Kingdom; 4, , University of California, Berkeley, Berkeley, California, United States; 5, , Lawrence Berkeley National Lab, Berkeley, California, United States; 6, , US Army Research Laboratory, Adelphi, Maryland, United States; 7, Department of Physics, University of Strathclyde, Glasgow, United Kingdom.

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11:45 AM -

OPEN DISCUSSION

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FF4: Defects in Oxides and Their Properties I

- Chair: Jagdish Narayan
- Wednesday PM, April 8, 2015
- Moscone West, Level 3, Room 3016

1:30 PM - *FF4.01

Role of Defects in Oxide Electronics

John T. Prater^{2,3}, Srinivasa Rao Singamaneni^{2,3}, Jagdish Narayan¹.

1, , North Carolina State University, Raleigh, North Carolina, United States; 2, Materials Science Division, U.S. Army Research Office, Durham, North Carolina, United States; 3, Matierlais Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States.

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2:00 PM - FF4.02

Microstructure and Transport Properties of Bi₂Se₃ Thin Films Grown on MgO (111), Cr₂O₃ (0001) and Al₂O₃ (0001) Substrates

Yi-Fang Lee¹, Jagdish Narayan¹, Justin Schwartz¹.

1, Materials Science and Engineering, North Carolina State University, Raleigh, North Carolina, United States.

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2:15 PM - FF4.03

Recent Advances in Identifying Point Defects in Semiconducting Oxides using Positron Annihilation Spectroscopy

Filip Tuomisto¹, Ilja Makkonen¹, Esa Korhonen¹.

1, , Aalto University, Aalto, Finland.

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2:30 PM - FF4.04

Novel "Tiling" Building Defects in Layered Compounds

T. Mori^{1,2}, X. J. Wang^{3,4}, I. Kuzmych-Ianchuk¹, Y. Michiue¹, K. Yubuta⁵, T. Shishido⁵, Y. Grin⁶, S. Okada⁷, D. G. Cahill³.

1, , NIMS, Tsukuba, Japan; 2, , U. Tsukuba, Tsukuba, Japan; 3, , U. Illinois, Urbana, Illinois, United States; 4, , U. Minnesota, Minnesota, Minnesota, United States; 5, , Tohoku U., Sendai, Japan; 6, , MPI-CPfS, Dresden, Germany; 7, , Kokushikan U., Tokyo, Japan.

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2:45 PM - FF4.05

Copper-Alloyed Zinc Sulfide: A Room Temperature Processed P-Type Transparent Material with Record Conductivity

Rachel Woods-Robinson¹, Jason Cooper¹, Xiaojie Xu¹, Joel W. Ager¹.

1, , Lawrence Berkeley National Laboratory, Berkeley, California, United States.

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3:00 PM -

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Show Abstract**3:30 PM - *FF4.09**

Interfacial Engineering of Large Bandgap Oxide Nanostructures for Solar Energy Conversion

Lionel Vayssieres¹.¹, IRCRE, Xian Jiaotong University, Xian, China.**Show Abstract****4:00 PM - FF4.07**

Large Persistent Photoconductivity in Strontium Titanate at Room Temperature

Violet M. Poole¹, J. Dashdorj², Mary Ellen Zvanut², Matthew D. McCluskey¹.¹, Washington State University, Pullman, Washington, United States; ², University of Alabama, Birmingham, Alabama, United States.**Show Abstract****4:15 PM - FF4.08**

Exploring the Beneficial Role of Defects in Quantum Dot Solids

Yingjie Zhang¹, Danylo Zhrebetskyy², Noah Bronstein³, Daniel Hellebusch³, Lin-Wang Wang⁴, A. Paul Alivisatos¹, Miquel B. Salmeron⁴.¹, UC Berkeley, Berkeley, California, United States; ², Materials Sciences Division, Lawrence Berkeley National Lab, Berkeley, California, United States; ³, Dept Of Chemistry, Univ of California-Berkeley, Berkeley, California, United States; ⁴, Lawrence Berkeley National Lab, Berkeley, California, United States.**Show Abstract****4:30 PM - *FF4.06**

Defects, Reconstruction and Formation of 2D Electron-Gas at Oxide Interfaces

Yimei Zhu¹ ².¹, Brookhaven National Lab, Upton, New York, United States; ², Physics & Astronomy, Stony Brook University, Stony Brook, New York, United States.**Show Abstract****FF5: Poster Session: Defects and Their Optoelectronic Properties in Energy-Related Materials**

- Chair: Su-Huai Wei
- Wednesday PM, April 8, 2015
- Marriott Marquis, Yerba Buena Level, Salon 7/8/9

8:00 PM - FF5.01

Study of Oxide Layers on Surfaces of CdZnTe Crystals by X-Ray Photoelectron Spectroscopy

Stephen Oluseyi Babalola¹, Claudiu I. Muntele², Jonathan Lassiter¹, Charles Payton¹, Madhu Goundla¹, Ryan Givens¹, Samuel Uba¹, Trent Montgomery¹.¹, Alabama A&M University, Huntsville, Alabama, United States; ², Cygnus Scientific Services, Huntsville, Alabama, United States.**Show Abstract**

8:00 PM - FF5.02

Suppressed the Spontaneous Reaction of Amorphous ZnO Nanowires by Using Plasma Surface Defect Passivation

Chun-Yen Lai¹, Ke Teng¹, Chien-Min Chang¹, Ping-Hung Yeh¹.

¹, , Tamkang University, New Taipei City, Taiwan.

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8:00 PM - FF5.03

Study of Photoluminescence Properties of Cu_xO Thin Films Prepared by Reactive-RF Magnetron Sputtering

Jiantuo Gan¹, Augustinas Galeckas¹, Vishnukanthan Venkatachalapathy¹, Heine Nygard Riise¹, Bengt Gunnar Svensson¹, Edouard Monakhov¹.

¹, Department of Physics /Center for Materials Science and Nanotechnology, University of Oslo, Oslo, Norway.

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8:00 PM - FF5.04

Designing Passivating, Carrier-Selective Contacts for Photovoltaic Devices

Mathieu Boccard¹, Priyaranga Koswatta¹, Zachary Holman¹.

¹, Dept of EC&EE, Arizona State Univ, Tempe, Arizona, United States.

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8:00 PM - FF5.05

Investigating Defects in HVPE-Grown Semi-Insulating GaN

Gyanendra Bhattarai¹, Christopher L Keck¹, Justin D Hurley¹, Joseph A Crow¹, J H Leach², K Udworthy², R A Metzger², A N Caruso¹, Michelle M Paquette¹.

¹, Department of Physics & Astronomy, University of Missouri-Kansas City, Kansas City, Missouri, United States;

², , Kyma Technologies, Raleigh, North Carolina, United States.

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8:00 PM - FF5.06

Urbach Energy as A Useful Parameter to Describe the Influence of the Defect Chemistry on the Emission and Absorption Bandgap Energies in ZnO Thin Films

David Horwat¹, William Chamorro².

¹, , Institut Jean Lamour-Université de Lorraine, Nancy, France; ², , Institut Jean Lamour-Université de lorraine, Nancy, France.

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8:00 PM - FF5.07

ZnO Nanowire Growth Properties on Selectively Disordered Substrates

Elias James Garratt¹, Babak Nikoobakht¹.

¹, , National Institute of Standards and Technology, Gaithersburg, Maryland, United States.

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8:00 PM - FF5.08

Defects in β -Ga₂O₃ Single Crystals

Viktor Maslov^{2 1}, Vladimir I. Nikolaev^{2 3 1}.

¹, Ioffe Physical-Technical Institute, Russian Academy of Sciences, St. Petersburg, Russian Federation; ², , St Petersburg National Research University ITMO, St Petersburg, Russian Federation; ³, , Perfect Crystals LLC, St. Petersburg, Russian Federation.

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FF5.09 WITHDRAWN 4-5-15

Show Abstract**8:00 PM - FF5.10**

Exploring the Photovoltage “Potential” of PbS QD Films

Erik Johansson¹, Vitalii Dereviankin¹, Valentin Uzunov¹.¹, , Portland State University, Portland, Oregon, United States.**Show Abstract****8:00 PM -**

FF5.11 WITHDRAWN 4-2-15

Show Abstract**8:00 PM - FF5.12**

Sn Effects on Thermal Donor Formation in Ge

Kaihei Inoue¹, Yu Murao¹, Toshinori Taishi³, Kentaro Kutsukake¹, Momoko Deura¹, Yutaka Ohno², Ichiro Yonenaga¹.¹, , Tohoku University, Sendai, Japan; ², , Institute for Materials Research, Tohoku University, Sendai, Japan;
³, , Shinshu University, Nagano, Nagano, Japan.**Show Abstract****2015-04-09****Symposium FF****Show All Abstracts****Symposium Organizers**

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FF6: Defects in Oxides and Their Properties II

- Chair: Chris Van de Walle
- Thursday AM, April 9, 2015
- Moscone West, Level 3, Room 3016

8:30 AM - *FF6.01

The Role of Vacancies in Controlling Diverse Properties of Complex Semiconductor System

Sokrates T. Pantelides^{1 2 3}.

1, Department of Physics and Astronomy, Vanderbilt University, Nashville, Tennessee, United States; 2, Department of Electrical Engineering and Computer Science, Vanderbilt University, Nashville, Tennessee, United States; 3, , Oak Ridge National Laboratory, Oak Ridge, Tennessee, United States.

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9:00 AM -

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9:15 AM - FF6.03

Correlated Visible-Light Absorption and Intrinsic Magnetism of SrTiO₃ by Oxygen Deficiency: Effects of Bulk or Surface?

Heechae Choi¹, Jin Dong Song¹, Seungchul Kim¹, Kwang-Ryeol Lee¹.

1, , Korea Institute of Science and Technology, Seoul, Korea (the Republic of).

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9:30 AM - FF6.04

Uncovering the Connection between Doping and Defects in WO₃

Wennie Wang¹, Anderson Janotti¹, Chris G. Van de Walle¹.

1, Materials Dept., Univ of California-Santa Barbara, Santa Barbara, California, United States.

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9:45 AM - FF6.05

Defect Calculations for Increasingly Complex Semiconductor Materials

Stephan Lany¹, Haowei Peng¹, Vladan Stevanovic^{1 2}.

1, , NREL, Golden, Colorado, United States; 2, , Colorado School of Mines, Golden, Colorado, United States.

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10:00 AM -

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FF7: Roles of Defects in Compound Semiconductors for Solar Cells

- Chair: Kin Man Yu
- Thursday AM, April 9, 2015
- Moscone West, Level 3, Room 3016

10:30 AM - *FF7.01

First-Principles Study of Defects in Solar Cell Absorbers: The Case of CdTe

Su-Huai Wei¹.

1, , National Renewable Energy Laboratory, Golden, Colorado, United States.

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11:00 AM - FF7.02

Hydrogenated Indium Oxide - Defects in a High Mobility Transparent Conducting Oxide

Sebastian Husein⁴, Simone Bernardini⁴, Steve M Heald³, Robert Gordon³, Laura Ding², Zachary Holman¹, Mariana Berton¹.

1, Dept of EC&EE, Arizona State Univ, Tempe, Arizona, United States; 2, , Arizona State University, Tempe, Arizona, United States; 3, X-ray Science Division, Advanced Photon Source, Lemont, Illinois, United States; 4, School for Matter, Transport, and Energy, Arizona State University, Tempe, Arizona, United States.

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11:15 AM - FF7.03

Thickness Dependent Band Gap Engineering of Chemically Deposited CdS Thin Films

Amanullah Fatehmulla¹, Abdullah Al-Shammari², Abdullah M Al-Dhafiri¹.

1, Department of Physics and Astronomy, King Saud University, Riyadh, Saudi Arabia; 2, Department of Physics, University of Hail, Hail, Saudi Arabia.

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11:30 AM - *FF7.04

Atomistic Study of Grain Boundaries in Polycrystalline Photovoltaic Semiconductors

Yanfa Yan¹.

1, , The University of Toledo, Toledo, Ohio, United States.

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FF8: Silicon and Thin Film Solar Cells

- Chair: Eicke Weber
- Thursday PM, April 9, 2015
- Moscone West, Level 3, Room 3016

1:30 PM - *FF8.01

Synchrotron-Based Analytical Techniques Elucidate Defect Structure-Property Relations in Silicon and Thin-Film Solar Cell Material

Rafael Jaramillo¹, Sin Cheng Siah², Rupak Chakraborty², Ashley Morishige², Douglas Powell², Mallory Jensen², Sergio Castellanos², Joerg Maser³, Barry Lai³, Matthew Marcus⁴, David P. Fenning², Jasmin Hofstetter², Tonio Buonassisi².

1, , Harvard Univ, Cambridge, Massachusetts, United States; 2, , Massachusetts Institute of Technology, Cambridge, Massachusetts, United States; 3, , Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois, United States; 4, , Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, California, United States; 5, , University of California, San Diego, San Diego, California, United States.

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2:00 PM - FF8.02

White Beam X-Ray Diffraction Topography (WBXDT) Studies of Bridgman Grown CdZnTe Crystals

Stephen Oluseyi Babalola¹, Samuel Uba¹, Anwar Hossain², Giuseppe Camarda², Ralph B. James², Trent Montgomery¹.

1, , Alabama A&M University, Huntsville, Alabama, United States; 2, NNS, Brookhaven National Laboratory, Upton, New York, United States.

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2:15 PM - FF8.10

Electrical Characteristics of RF Sputtered ZnO/HfO₂ Interfaces in Thin Film Transistors

Prem Shankar Thapaliya¹, Rashmi Jha¹.

1, , University of Toledo, Toledo, Ohio, United States.

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2:30 PM - FF8.04

Many Body Perturbation Theory Study of Defects in Crystalline and Amorphous SiO₂ and GeO₂ and the Influence of Dopants

Nicolas Richard¹, Layla Martin Samos³ 2, Luigi Giacomazzi³, Sylvain Girard⁴, Aziz Boukenter⁴, Youcef Ouerdane⁴, Blaz Winkler².

1, , CEA, Arpajon, France; 2, Materials Research Laboratory, University of Nova Gorica, Nova Gorica, Slovenia; 3, DEMOCRITOS, CNR-IOM, Trieste, Italy; 4, Laboratoire Hubert Curien, Université de Saint-Etienne, Saint-Etienne, France.

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3:15 PM - *FF8.05

Quantifying the Role of Recombination Active Defects in Multicrystalline Silicon for Photovoltaics

Martin C Schubert¹, Wolfram Kwapil¹ 2, Jonas Schoen¹, Bernhard Michl¹, Florian Schindler¹ 2, Wilhelm Warta¹.

1, , Fraunhofer Institute for Solar Energy Systems, Freiburg, Germany; 2, FMF, University of Freiburg, Freiburg, Germany.

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3:45 PM - FF8.06

Utilization of Functional Grain Boundaries for Mono-Like Si for Solar Cells

Kentaro Kutsukake¹, Yutaka Ohno¹, Momoko Deura¹, Ichiro Yonenaga¹.

1, , Tohoku University, Sendai, Japan.

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4:00 PM - FF8.07

Effects of Bond Distortions on Impurity Segregation in High-Angle Grain Boundaries in Silicon

Yutaka Ohno³, Kaihei Inoue³, Momoko Deura³, Kentaro Kutsukake³, Ichiro Yonenaga³, Naoki Ebisawa⁴, Yasuo Shimizu⁴, Koji Inoue⁴, Yasuyoshi Nagai⁴, Hideto Yoshida², Seiji Takeda², Shingo Tanaka¹, Masanori Kohyama¹.

1, , AIST Kansai, Osaka, Japan; 2, , Osaka University, Osaka 567-0047, Japan; 3, , IMR, Tohoku University, Sendai, Japan; 4, , The Oarai Center, IMR, Tohoku University, Oarai, Japan.

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4:15 PM - FF8.08

Molecular Dynamics Study of Dislocation Formation Mechanism in <112>-Oriented Si-Ge Core-Shell Nanowires Under Tension

HyungGyu Lee¹, Keonwook Kang¹.

1, , Yonsei University, Seoul, Korea (the Republic of).

Show Abstract**4:30 PM - FF8.09**

Correlation Between Crystalline Defects and Electrical Response in 4H-SiC Schottky Diodes by Simultaneous Photoluminescence and Photocurrent Measurements

Stefania Privitera¹, Massimo Camarda¹, Nicolo Piluso¹, Ruggero Anzalone¹, Francesco La Via¹.

¹, Institute of Microelectronics and Microsystems, National Research Council, Catania, Italy.

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Symposium GG, Foundations of Bio/Nano Interfaces: Synthesis, Modeling, Design Principles, and Applications

The symposium focused on fundamental understanding of biological/biomimetic-solid interfaces as well as their implementation into ordered nanoscale assemblies for drug delivery, tissue replacements, catalysis, sensors, electronics, and photonics applications.

The symposium promoted the exchange of cutting edge research on bionanointerfaces at the 1 to 100 nm scale, discussion of approaches for the rational design of biomimetic materials, and identification of novel applications in biosensors, catalysts, ultra strong composites, electronics, and photonics devices. The symposium built on invited talks from thought leaders in the field of bionanointerfaces and included state-of-the-art experimental as well as modeling contributions that were balanced to cross-fertilize related research communities. Research reported in this symposium supported the development of new intelligence systems, biologically strong and lightweight materials, advanced electronics, and sustainable catalysts. The symposium consisted of 9 half day sessions and comprised 18 invited talks, 64 contributed talks, as well as 48 poster presentations, totaling 130 contributions.

The symposium topics had broad significance for developments across the materials and defense research community. Hierarchical organization from the nanoscale to the macroscale helps achieve greatest specificity and functional diversity of materials and structures, and the integration of laboratory studies with ever-increasing computational methods offers many benefits. The symposium was opened to all attendees of the MRS Spring Meeting and included broad participation from graduate students, post-docs, as well as senior researchers from academia, government, and industry. Opportunities for collaboration as well as career opportunities among the participants and their institutions were explored. Symposium GG also had a significant amount of international presenters, particularly from Japan (Yuhei Hayamizu, Takayoshi Sasaki, Kiyotaka Shiba, Ichiro Yamashita), Europe (Joachim Bill, Stefano Corni, Carole Perry, Nina Heidary), and Australia (Mark Biggs).

ARO support for the symposium helped to defray registration and travel expenses for the following symposium participants:

Hendrik Heinz, University of Colorado-Boulder
Ali Dhinojwala, University of Akron
Stefano Corni, CNR Inst of Nanoscience
Catherine Murphy, University of Illinois-Urbana
William Goddard, California Inst of Technology
Jacob Israelachvili, UC-Santa Barbara
Kyle Boone, University of Kansas
Amanda Garley, University of Akron

Symposium GG, Foundations of Bio/Nano Interfaces: Synthesis, Modeling, Design Principles, and Applications

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On-Demand (video recording): Symposium GG: Foundations of Bio/Nano Interfaces-Synthesis, Modeling, Design Principles and Applications: The symposium focused on fundamental understanding of biological/biomimetic-solid interfaces as well as their implementation into ordered nanoscale assemblies for drug delivery, tissue replacements, catalysis, sensors, electronics, and photonics applications.

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Interfaces of Molecular Recognition Sites and Biosensors; Novel Bio-Sensing Materials
Kyung M. Choi

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 1-6](#)

doi: 10.1557/opl.2015.575, Published online by Cambridge University Press 09 Jun 2015

Monitoring the size and the stability of zinc oxide quantum dots in biological media: a soft ionization mass spectrometry technique (MALDI-TOF-MS)
Jean-Jacques Gaumet and Gabriel Gaiffe and Clément Dezanet and Stéphane Dalmasso and Pierre Magri and Lavinia Balan and Raphaël Schneider

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 7-12](#)

doi: 10.1557/opl.2015.620, Published online by Cambridge University Press 17 Jun 2015

Label-Free Rapid Detection of Pathogens with Antimicrobial Peptide Assisted Impedance Spectrometry
Keren Jiang and Hashem Etayash and Sarfuddin Azmi and Garima Thakur and Selvaraj Naicker and Kamaljit Kaur and Thomas Thundat

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 13-18](#)

doi: 10.1557/opl.2015.619, Published online by Cambridge University Press 17 Jun 2015

Breast cancer detection using charge sensors coupled to DNA monolayer
Marina R. Batistuti and Marcelo Mulato and Paulo R. Bueno

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 19-26](#)

doi: 10.1557/opl.2015.671, Published online by Cambridge University Press 02 Jul 2015

Optically active II-VI semiconductor nanocrystals via chiral phase transfer
Maria V. Mukhina and Vladimir G. Maslov and Ivan V. Korsakov and Finn Purcell Milton and Alexander Loudon and Alexander V. Baranov and Anatoly V. Fedorov and Yurii K. Gun'ko

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 27-33](#)

doi: 10.1557/opl.2015.652, Published online by Cambridge University Press 30 Jun 2015

Single Molecular Layer Adaption of Interfacial Surfaces by Cyclic Azasilane "Click-Chemistry"
Annalese F. Maddox and Janis G. Matisons and Mani Singh and Joel Zazyczny and Barry Arkles

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 35-40](#)

doi: 10.1557/opl.2015.655, Published online by Cambridge University Press 30 Jun 2015

Inelastic Neutron Scattering Studies of Natural Silkworm Proteins
Christopher Alan Crain and Nicholas A. Strange and J. Z. Larese

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 41-46](#)

doi: 10.1557/opl.2015.658, Published online by Cambridge University Press 30 Jun 2015

Characterization of Dipeptide-based Sorbent Materials using Combined Thermodynamic and Inelastic Neutron Scattering Techniques
Daniele Paradiso and Enrico Perelli Cippo and Giuseppe Gorini and Giorgio Rossi and J. Z. Larese

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 47-52](#)

doi: 10.1557/opl.2015.664, Published online by Cambridge University Press 01 Jul 2015

Nano-boron as an Antibacterial Agent for Functionalized Textiles
Wazir Akbar and Ayse Karagoz and G.Bahar Basim and Mohamed Noor and Tofail Syed and Jacob Lum and Merve Unluagac

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 53-57](#)

doi: 10.1557/opl.2015.728, Published online by Cambridge University Press 28 Jul 2015

Molecular simulation of adhesion property recovery in the cellulose/phenolic adhesive interface: the role of water molecules
Lik-ho Tam and Denvi Lau

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 59-66](#)

doi: 10.1557/opl.2015.826, Published online by Cambridge University Press 08 Oct 2015

Customization of mechanical properties and porosity of bone tissue scaffold materials via Layer-by-Layer assembly of polymer-nanocomposite coatings

M. Ziminska and N. Dunne and A. Hamilton

[MRS Online Proceedings Library Archive, Volume 1793, 2015, pp 67-72](#)

doi: 10.1557/opl.2015.827, Published online by Cambridge University Press 08 Oct 2015



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doi: 10.1557/opl.2015.846, Published online by Cambridge University Press 23 Nov 2015

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Program: Symposium GG—Foundations of Bio/Nano Interfaces—Synthesis, Modeling, Design Principles and Applications



2015 MRS Spring Meeting & Exhibit

April 6-10, 2015

San Francisco, California



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2015-04-07

Symposium GG

[Show All Abstracts](#)

Symposium Organizers

- Yuhei Hayamizu, Tokyo Institute of Technology
- Hendrik Heinz, University of Akron
- Carole Perry, Nottingham Trent University
- Candan Tamerler, University of Kansas

GG1: Biomineralization

- Chair: Candan Tamerler
- Chair: Carole Perry
- Tuesday AM, April 7, 2015
- Park Central Hotel, 2nd Floor, Metropolitan III

8:30 AM - GG1.01

Bio-Directed Assembly of Functional One-Dimensional ZnO Nanostructures

[Chung Hee Moon](#)¹, Tam-Triet Ngo-Duc¹, Marzieh Tousi², Elaine D Haber¹ ³.

1, Materials Science and Engineering Program, University of California, Riverside, Riverside, California, United States; 2, Chemical and Environmental Engineering, University of California, Riverside, Riverside, California, United States; 3, Electrical and Computer Engineering, University of California, Riverside, Riverside, California, United States.

Show Abstract

8:45 AM - GG1.02

Peptide-Based Strategies to Control the Structure/Function Relationship of Nanocatalysts

Marc R. Knecht¹, Ryan Coppage¹, Hadi Ramezani-Dakhel⁵, Beverly Briggs¹, Nicholas Bedford², Joseph Slocik³, Anatoly Frenkel⁴, Hendrik Heinz⁵, Rajesh Naik³.

1, , University of Miami, Coral Gables, FL, United States; 2, , National Institute of Standards and Technology, Boulder, Colorado, United States; 3, , Air Force Research Laboratory, Dayton, Ohio, United States; 4, , Yeshiva University, New York, New York, United States; 5, , University of Akron, Akron, Ohio, United States.

Show Abstract

9:00 AM - GG1.03

Genetically Driven Formation of Biotemplates Made of Tobacco Mosaic Viruses: Towards Nanostructured Bio/inorganic Hybrids

Petia Atanasova¹, Nina Sitz¹, Shawn Sanctis³, Johannes Maurer², Sabine Eiben⁴, Holger Jeske⁴, Joerg J. Schneider³, Joachim Bill¹.

1, , Institute for Materials Science, University of Stuttgart, Stuttgart, Germany; 2, , INM - Leibniz-Institute for New Materials, Saarbruecken, Saarbruecken, Germany; 3, Eduard-Zintl-Institut für Anorganische und Physikalische Chemie, Technical University of Darmstadt, Darmstadt, Germany; 4, Institute of Biomaterials and Biological Systems, University of Stuttgart, Stuttgart, Germany.

Show Abstract

9:15 AM - *GG1.04

Biomimicry at Molecular Scale: Understanding and Designing Interfacial Interactions to Achieve Specific Material Structures

Yu Huang¹.

1, , University of California Los Angeles, Los Angeles, California, United States.

Show Abstract

9:45 AM -

OPEN DISCUSSION

Show Abstract

10:00 AM -

BREAK

Show Abstract

10:30 AM - GG1.07

Molecular Engineering of Bioactivity at the Bio-NanoMaterial Interfaces

Candan Tamerler¹.

1, , University of Kansas, Lawrence, Kansas, United States.

Show Abstract

10:45 AM - GG1.08

Acid Base Properties of PDMPO and Its Use in the Study of (Bio)Silicification

Mithun Parambath¹, Quentin S Hanley¹, Carole Celia Perry¹.

1, , Nottingham Trent University, Nottingham, United Kingdom.

Show Abstract

11:00 AM - GG1.09

Combined Effect of Soluble Additives and Compartmentalized Environments on the Growth of Hydroxyapatite Crystals

Bartosz Marzec¹, Bram Cantaert¹, Steven Brookes², Fiona C. Meldrum¹.

1, School of Chemistry, University of Leeds, Leeds, West Yorkshire, United Kingdom; 2, School of Dentistry, University of Leeds, Leeds, West Yorkshire, United Kingdom.

Show Abstract

11:15 AM - GG1.10

The Biomimetic Synthesis and Hydrothermal Devitrification of Highly Photocatalytic TiO₂ Hybrid Nanomaterials

Matthew B. Dickerson², Paul Griffin², Nicholas Bedford^{1 2}, Lloyd Nadeau², Peter A. Mirau², Joseph M. Slocik², Rajesh R. Naik², Michael Jespersen².

1, , National Institute of Standards and Technology, Boulder, Colorado, United States; 2, Materials and Manufacturing Directorate, Air Force Research Laboratory, Dayton, Ohio, United States.

Show Abstract

GG2: Nanomaterials with Biomolecules I

- Chair: Hendrik Heinz
- Chair: Carole Perry
- Tuesday PM, April 7, 2015
- Park Central Hotel, 2nd Floor, Metropolitan III

1:30 PM -

GG2.01 moved to GG8.00

Show Abstract

1:30 PM - *GG2.02

The Chemical Nature of the Gold Nanoparticle-Biomolecule Interface

Catherine Jones Murphy¹.

1, , University of Illinois at Urbana-Champaign, Urbana, Illinois, United States.

Show Abstract

2:00 PM - GG2.03

Gold Nanoparticle - Lipid Self-Assembly and Interactions: Insights from Computer Modeling

Zilu Wang¹, Elena Dormidontova¹.

1, Institute of Materials Science and Physics Department, University of Connecticut, Storrs, Connecticut, United States.

Show Abstract

2:15 PM - GG2.04

A Robust Surface Plasmon Resonance Based Protocol to Study Biomolecules-Nanoparticle Interactions

Abhijeet Patra^{2 1}, Ding Tao³, Gokce Engudar⁴, Chester Drum³, Thirumalai Venkatesan², James Kah⁴.

1, , NUS Graduate School for Integrative Sciences & Engineering, Singapore, Singapore; 2, , NUSNNI Nanocore, National University of Singapore, Singapore, Singapore; 3, , Cardiovascular Research Institute, National University

of Singapore, Singapore, Singapore; 4, Biomedical Engineering, National University of Singapore, Singapore, Singapore.

Show Abstract

2:30 PM - GG2.05

Monitoring the Size and the Stability of Zinc Oxide Quantum Dots in Biological Media: A Soft Ionization Mass Spectrometry Technique (MALDI-TOF-MS)

Jean Jacques Gaumet¹, Gabriel Gaiffe¹, Stephane Dalmasso¹, Pierre Magri¹, Raphael Schneider².

1, LCP-A2MC, Jean Barriol Institute, University of Lorraine, Metz, France; 2, LRGP, UPR CNRS 3349, University of Lorraine, Nancy, France.

Show Abstract

2:45 PM -

BREAK

Show Abstract

3:15 PM - GG2.06

When Less is More: Grafting Density and Colocation Affect Cell Internalization of Peptide Decorated Nanoparticles

Nevena Todorova¹, Ciro Chiappini², Morgan Mager², Benjamin Simona², Imran I. Patel², Molly M. Stevens², Irene Yarovsky¹.

1, Health Innovations Research Institute and School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University, Melbourne, Victoria, Australia; 2, Department of Materials, Department of Bioengineering, and Institute for Biomedical Engineering, Imperial College London, London, United Kingdom.

Show Abstract

3:30 PM - *GG2.07

Genetic Design of Biology/2D Atomic-Layer Solid Interfaces

Mehmet Sarikaya¹.

1, , University of Washington, Seattle, Washington, United States.

Show Abstract

4:00 PM - GG2.08

Interfacial Design of Nanostructured Silicon Photonic Materials for Biomedical Applications

Tiffany Huang¹, Kristopher Kilian¹.

1, , University of Illinois at Urbana-Champaign, Urbana, Illinois, United States.

Show Abstract

4:15 PM - GG2.09

A Nanohybrid System Based on Holotransferrin and Maghemite Nanoparticles as a Promising Theranostic Device

Miryana Hemadi¹, Helene Piraux¹, Jun Hai¹, Souad Ammar¹, Florent Barbault¹, Florence Gazeau², Philippe Verbeke³, Jean-Michel El Hage Chahine¹.

1, ITODYS, Université Paris Diderot, Paris, France; 2, MSC, Université Paris Diderot, Paris, France; 3, IJM, Université Paris Diderot, Paris, France.

Show Abstract

4:30 PM - GG2.10

Computational Approaches in Molecular Recognition and Surface Dynamics of Peptides on 2D Solids

Sefa Dag¹, Yuhei Hayamizu², Mehmet Sarikaya¹, David Starkebaum¹, Tamon Page¹.

1, Genetically Engineered Materials Science and Engineering Center, MSE, University of Washington, Seattle, Washington, United States; 2, Organic and Polymeric Materials, Tokyo Institute of Technology, Tokyo, Japan.

Show Abstract

2015-04-08

Symposium GG

Show All Abstracts

Symposium Organizers

- Yuhei Hayamizu, Tokyo Institute of Technology
- Hendrik Heinz, University of Akron
- Carole Perry, Nottingham Trent University
- Candan Tamerler, University of Kansas

GG3: Nanomaterials with Biomolecules II

- Chair: Hendrik Heinz
- Chair: Candan Tamerler
- Wednesday AM, April 8, 2015
- Park Central Hotel, 2nd Floor, Metropolitan III

8:00 AM - GG3.01

M13 Bacteriophage Displaying DOPA on Surfaces: Fabrication of Various Nanostructured Inorganic Materials without Time-Consuming Screening Processes

Joseph Paul Park¹, Minjae Do³, Hyo-Eon Jin², Seung-Wuk Lee², Haeshin Lee¹ ³.

1, Nanoscience and Technology, KAIST (Korea Advanced Institute of Science and Technology), Daejeon, Korea (the Republic of); 2, Bioengineering, Univ of California-Berkeley, Berkeley, California, United States; 3, Chemistry, KAIST (Korea Advanced Institute of Science and Technology), Daejeon, Korea (the Republic of).

Show Abstract

8:15 AM - *GG3.02

Quantitative Analysis of the Molecular/Ionic Species Adsorbed on the Surface of a Nanomaterial

Younan Xia¹.

1, , Georgia Institute of Technology, Atlanta, Georgia, United States.

Show Abstract

8:45 AM - GG3.03

Microfabricated Nanoporous Gold Coatings Promote Cortical Cell Type-Dependent Surface Coverage

Christopher Chapman¹, Hao Chen², Marianna Stamou², Juergen Biener³, Monika Biener³, Pamela Lein², Erkin Seker⁴.

1, Biomedical Engineering, University of California, Davis, Davis, California, United States; 2, Molecular Biosciences, University of California, Davis, Davis, California, United States; 3, , Lawrence Livermore National Laboratory, Livermore, California, United States; 4, Electrical & Computer Engineering, University of California, Davis, Davis, California, United States.

Show Abstract

9:00 AM - *GG3.04

Elucidating and Controlling Biotic/Abiotic Interfacial Interactions for Enhancing Material Properties

Rajesh Naik¹.

1, Soft Matter Materials Branch, Air Force Research Laboratory, Dayton, Ohio, United States.

Show Abstract

9:30 AM - GG3.05

Controlling the Biodistribution of Mesoporous Silica Nanoparticle-Supported Lipid Bilayers by Modulating Properties of the Bio/Nano Interface

Eric C. Carnes¹, Brandon Slaughter¹, Christopher Lino¹, Amber McBride², Marissa R. Anderson¹, Patrick Fleig¹, Andrew Gomez¹, Caroline Bouvie², Matthew Jackson¹, Brian Wilkinson¹, Claire Melo¹, C. Jeffrey Brinker¹ ², Carlee Ashley¹.

1, , Sandia National Laboratories, Albuquerque, New Mexico, United States; 2, , University of New Mexico, Albuquerque, New Mexico, United States.

Show Abstract

9:45 AM -

BREAK

Show Abstract

10:15 AM - GG3.06

Induction of Chirality and Chiroptical Activity in Inorganic Nanocrystals Using Biomolecules

Assaf Ben Moshe¹, Gil Markovich¹.

1, Dept of Chemistry, Tel Aviv Univ, Tel Aviv, Israel.

Show Abstract

10:30 AM - *GG3.07

Atomistic Simulations of Proteins Interacting with Gold Surfaces and Nanoparticles

Stefano Corni¹.

1, , Center S3, CNR Institute of Nanoscience, Modena, Italy.

Show Abstract

11:00 AM - GG3.08

Surfactant-Free Nanoparticle-DNA Complexes with Ultrahigh Stability Against Salt for Environmental and Biological Sensing

Jun Hyuk Heo¹, Huihun Cho², Jung Heon Lee¹ ².

1, School of Advanced Materials Science and Engineering, Sungkyunkwan University, Suwon, Korea (the Republic of); 2, , Sungkyunkwan University (SKKU) Advanced Institute of Nanotechnology (SAINT), Suwon, Korea (the Republic of).

Show Abstract

11:15 AM - GG3.09

Customisation of Mechanical Properties and Porosity of Tissue Scaffold Materials via Layer-by-Layer Assembly of Polymer-Nanocomposite Coatings

Monika Ziminska¹, Nicholas Dunne¹, Andrew Hamilton¹.

1, Mechanical & Aerospace Engineering, Queen's University Belfast, Belfast, Antrim, United Kingdom.

Show Abstract

11:30 AM - GG3.10

Engineering a Quantum Dot Multiplexing Assay for the Development of Enzyme and Nucleic Acid Diagnostics

Polina Brangel¹, Philip D Howes¹, Robert Chapman¹, Molly Stevens¹.

¹, Dept of Materials, Imperial College London, London, United Kingdom.

Show Abstract

11:45 AM - GG3.11

Phospholipid Bilayers on Vertical Nanowire Arrays

Aleksandra P Dabkowska^{1 2}, Cassandra S. Niman^{2 3}, Gaelle Piret², Henrik Persson^{2 3}, Hanna Wacklin^{4 5}, Heiner Linke^{2 3}, Christelle Prinz^{3 6}, Tommy Nylander^{1 2}.

¹, Division of Physical Chemistry, Department of Chemistry, Lund University, Lund, Sweden; ², The Nanometer Structure Consortium (nmC@LU), Lund University, Lund, Sweden; ³, Division of Solid State Physics, Lund University, Lund, Sweden; ⁴, European Spallation Source ESS AB, Lund, Sweden; ⁵, Department of Chemistry, University of Copenhagen, Copenhagen, Denmark; ⁶, Neuronano Research Center, Lund University, Lund, Sweden.

Show Abstract

GG4: Biomolecular Engineering: Peptides, Proteins, DNA

- Chair: Carole Perry
- Chair: Yuhei Hayamizu
- Wednesday PM, April 8, 2015
- Park Central Hotel, 2nd Floor, Metropolitan III

1:30 PM - GG4.01

Understanding the Thermodynamics of DNA Hybridization to Spherical Nucleic Acids

Matthew Robert Jones², Pratik Randeria³, Kevin Kohlstedt⁴, Resham Banga⁵, Monica Olvera de la Cruz¹, George C. Schatz¹, Chad A. Mirkin⁴.

¹, Northwestern University, Evanston, Illinois, United States; ², Materials Science & Engineering, Northwestern University, Evanston, Illinois, United States; ³, Biomedical Engineering, Northwestern University, Evanston, Illinois, United States; ⁴, Chemistry, Northwestern University, Evanston, Illinois, United States; ⁵, Chemical and Biological Engineering, Northwestern University, Evanston, Illinois, United States.

Show Abstract

1:45 PM - *GG4.02

The Design Principles for Colloidal Crystals made from Proteins Modified with Nucleic Acids

Chad A. Mirkin¹.

¹, Northwestern University, Evanston, Illinois, United States.

Show Abstract

2:15 PM - GG4.03

The INTERFACE Force Field to Unite Materials and Biomolecular Simulation in a Single Platform: Examples of Protein Recognition on Metals, Silicates, and Phosphates

Hendrik Heinz¹.

¹, University of Akron, Akron, Ohio, United States.

Show Abstract

2:30 PM - GG4.04

Conductance Properties of DNA Duplexes and DNA:RNA Hybrids

Joshua Hihath¹, Yuanhui Li¹, Juan Manuel Artes Vivancos¹, Jianqing Qi², M P Anantram².

1, Electrical and Computer Engineering, University of California - Davis, Davis, California, United States; 2, Electrical Engineering, University of Washington, Seattle, Washington, United States.

Show Abstract

2:45 PM -

BREAK

Show Abstract

3:15 PM - *GG4.05

Molecular Modelling of Peptide Adsorption: From Fundamentals to Design to Applications

Mark James Biggs¹.

1, , Loughborough University, Loughborough, United Kingdom.

Show Abstract

3:45 PM - GG4.06

In Silico Design of Bioactive Peptides for Bio-Material Surface Decoration

Chiara Cosenza¹, Filippo Causa^{1 3 2}, Paolo Antonio Netti^{1 3 2}.

1, Center for Advanced Biomaterials for Health Care, Istituto Italiano di Tecnologia, Naples, Italy; 2, Department of Chemical and Materials Engineering and Industrial Production, University of Naples "Federico II", Naples, Italy; 3, Interdisciplinary Research Centre on Biomaterials (CRIB), University of Naples "Federico II", Naples, Italy.

Show Abstract

4:00 PM - GG4.07

ZnO-Binding Peptides: Smart, Versatile Tools for Controlled Modification of ZnO Growth Mechanism and Morphology

Carole Celia Perry¹, Marion Jebet Limo¹.

1, , Nottingham Trent University, Nottingham, United Kingdom.

Show Abstract

4:15 PM - GG4.08

Sequence-Dependent Structure/Function Elucidation of Peptide-Enabled Nanoparticles Using a Combined Experimental/Computational Approach

Nicholas Bedford¹, Rajesh Naik², Marc R Knecht⁵, Hendrik Heinz⁷, Tiffany Walsh⁶, Valeri Petkov³, Anatoly Frenkel⁸, Lauren F Greenlee⁴.

1, , National Institute of Standards and Technology, Boulder, Colorado, United States; 2, , Air Force Research Laboratory, Dayton, Ohio, United States; 3, Dept. Physics, Central Michigan University, Mt Pleasant, Michigan, United States; 4, , National Institute of Standards & Technology, Boulder, Colorado, United States; 5, , University of Miami, Coral Gables, Florida, United States; 6, , Deakin Univ, Geelong, Victoria, Australia; 7, , University of Akron, Akron, Ohio, United States; 8, , Yeshiva University, New York, New York, United States.

Show Abstract

4:30 PM - GG4.09

Peptide Modification of Polyimide-Insulated Microwires

Sangita Sridar¹, Matthew Churchward¹, Kathryn Todd¹, Anastasia Leila Elias¹.

1, , University of Alberta, Edmonton, Alberta, Canada.

Show Abstract

GG5: Poster Session: Foundations of Bio/Nano Interfaces

- Chair: Candan Tamerler
- Wednesday PM, April 8, 2015
- Marriott Marquis, Yerba Buena Level, Salon 7/8/9

8:00 PM - GG5.01

Understanding the Interactions Between Gold Nanorods and Cell Membrane Models

Thiers Massami Uehara¹, Juliana Cancino¹, Valeria Marangoni¹, Paula Lins¹, Paulo Barbeitas Miranda¹, Valtencir Zucolotto¹.

¹, , Universidade de Sao Paulo, Sao Carlos, Sao Paulo, Brazil.

Show Abstract

8:00 PM - GG5.02

Peptide Functionalized Magnetic Nanoparticles for Gold Mining

Weizheng Shen^{1 2}, Sibel Cetinel^{1 2}, Carlo Montemagno^{1 2}.

¹, , Ingenuity Lab, Edmonton, Alberta, Canada; ², Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada.

Show Abstract

8:00 PM - GG5.03

Synthesis of an Fe Rich Amorphous Structure with a Catalytic Effect to Rapidly Decolorize Azo Dye at Room Temperature

Peng Liu¹, Chan Hung Shek¹.

¹, Physics and Materials Science, City University of Hong Kong, Hong Kong, China.

Show Abstract

8:00 PM - GG5.04

Biologically-Inspired Polymer-Protein Hybrid Membranes for Water Purification

Yuan He^{1 2}, Hiofan Hoi^{1 2}, Sinoj Abraham^{1 2}, Jeffrey Germain², Carlo Montemagno^{1 2 3}.

¹, Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada; ², , Ingenuity Lab, Edmonton, Alberta, Canada; ³, National Inst of Nanotech, Univ of Alberta, Edmonton, Alberta, Canada.

Show Abstract

8:00 PM - GG5.05

Hydrophobically-Modified Silica Aerogels: Novel Food-Contact Surfaces with Bacterial Anti-Adhesion Properties

Jun Kyun Oh¹, Luis Cisneros-Zevallos¹, Mustafa Akbulut¹.

¹, , Texas A&M University, College Station, Texas, United States.

Show Abstract

8:00 PM - GG5.06

Stratified, Responsive Brush-Gel Films: Towards Biomimetic Graded Interfaces

Shivaprakash N. Ramakrishna¹, Marco Cirelli², Edmondo Maria Benetti^{1 2}.

¹, , Swiss Federal Institute of Technology ETH Zürich, Zürich, Switzerland; ², , University of Twente, Enschede, Netherlands.

Show Abstract

8:00 PM - GG5.07

Bio-Inspired Omniphobic Surfaces of Silicon Nanopillars Modified by Triethoxysilan-Based Hybrid Coatings

Ching-Yu Yang², Yu-Hsiang Lo², Bi-Shen Lee², Ta-Jen Yen², Hsin-Ming Cheng¹, Po-Yu Chen².

1, , Material & Chemical Res Lab, Hsin Chu, Taiwan; 2, , National Tsing-Hua University, Hsin-chu, Taiwan.

Show Abstract

8:00 PM - GG5.08

Conformational Gating of DNA Conductance: From Single Molecule Charge Transport to Electrochemical Platforms for Sensor Applications

Juan Manuel Artes Vivancos¹, Yuanhui Li², Jianqing Qi³, Erkin Seker¹, M P Anantram³, Joshua Hihath¹.

1, , ECE UC Davis, Davis, California, United States; 2, , Univ of California-Davis, Davis, California, United States;

3, , Univ of Washington, Seattle, Washington, United States.

Show Abstract

8:00 PM - GG5.09

Interfaces of Molecular Recognition Sites and Biosensors: Novel Bio-Sensing Materials

Kyung Choi¹.

1, , University of California-Irvine, Irvine, California, United States.

Show Abstract

8:00 PM - GG5.10

Selective Virus Separation with Conductive Inverse Opal Films

Chia-Hao Pai¹, Chen-Hong Liao¹, Eric Hwang², Yung-An Huang³, Yu Cheng¹, Wei-An Yeh⁴, Pei-Song Hong¹, PuWei Wu¹.

1, Materials Science and Engineering, National Chiao Tung University, Hsinchu, Taiwan; 2, Biological Science and Technology, Molecular Medicine and Bioengineering, National Chiao Tung University, Hsinchu, Taiwan; 3, Biological Science and Technology,, National Chiao Tung University, Hsinchu, Taiwan; 4, Molecular Medicine and Bioengineering, National Chiao Tung University, Hsinchu, Taiwan.

Show Abstract

8:00 PM -

GG5.11 WITHDRAWN (3-10-15)

Show Abstract

8:00 PM - GG5.12

Nanostructured Electrochemical Transducers Realized with Nanoimprint Lithography

Lotta Emilia Delle¹, Bert Laegel², Rainer Lilischkis¹, Xuan Thang Vu³, Maryam Weil¹, Patrick Wagner⁴, Sven Ingebrandt¹.

1, Computer Sciences and Microsystems Technology, University of Applied Sciences Kaiserslautern, Zweibrücken, Germany; 2, Nano Structuring Center, TU Kaiserslautern, Kaiserslautern, Germany; 3, Institute for Physics, RWTH Aachen, Aachen, Germany; 4, Institute for Materials Research, Hasselt University, Hasselt, Belgium.

Show Abstract

8:00 PM - GG5.13

Inelastic Neutron Scattering Studies of Natural Silkworm Proteins

Christopher Alan Crain¹, Nicholas A Strange¹, Luke Daeman², Svemir Rudic³, John Z. Larese¹.

1, , University of Tennessee, Knoxville, Tennessee, United States; 2, , Lujan Center, Los Alamos Neutron Science Center, LANL, Los Alamos, New Mexico, United States; 3, , ISIS, Rutherford Appleton Laboratory, Didcot, Oxfordshire, United Kingdom.

Show Abstract

8:00 PM -

GG5.14 WITHDRAWN 3-20-15

Show Abstract**8:00 PM - GG5.15**

One-Stop Solution for Delivery of Unstable Oral Drugs

Hyo-Jick Choi^{1,2}, Ankit Kumar^{1,2}, Carlo Montemagno^{1,2,3}.

1, Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada;
 2, , Ingenuity Lab, Edmonton, Alberta, Canada; 3, , National Institute for Nanotechnology, Edmonton, Alberta, Canada.

Show Abstract**8:00 PM - GG5.16**

Development of Oral Influenza Vaccines: One Step Closer

Ankit Kumar^{1,2}, Hyo-Jick Choi^{1,2}, Carlo Montemagno^{1,2,3}.

1, Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada;
 2, , Ingenuity Lab, Edmonton, Alberta, Canada; 3, , National Institute for Nanotechnology, Edmonton, Alberta, Canada.

Show Abstract**8:00 PM - GG5.17**

Single-Molecule Conductance Measurements of DNA:RNA Hybrids

Yuanhui Li¹, Juan Manuel Artes Vivancos¹, Jianqing Qi², M P Anantram², Ian A. Morelan³, Paul Feldstein³, Josh Hihath¹.

1, Electrical and Computer Engineering, University of California, Davis, Davis, California, United States; 2, Electrical Engineering, University of Washington, Seattle, Washington, United States; 3, Plant Pathology, University of California, Davis, Davis, California, United States.

Show Abstract**8:00 PM - GG5.18**Study of Magnetic Hyperthermia Properties for Octahedral Fe₃O₄ NanoparticlesYunbo Lv^{1,2}, Yong Yang¹, Wen Xiao¹, Jun Ding¹.

1, Department of Materials Science and Engineering, National University of Singapore, Singapore, Singapore; 2, NUS Graduate School for Integrative Sciences & Engineering, National University of Singapore, Singapore, Singapore.

Show Abstract**8:00 PM - GG5.19**

Nanomaterial in Regulating the Differentiation of Stem Cells for Tissue Engineering

Shu Wang¹, Xiaoning Mou², Hong Liu¹.

1, , Beijing Institute of Nanoenergy and Nanosystems, Beijing, China; 2, , Chinese Academy of Sciences, Beijing, China.

Show Abstract**8:00 PM - GG5.20**

DNA-Guided Semiconducting Organic Particles with Hybridization-Induced Nano-Embossing

Seung Hyuk Back¹, Jin Hyuk Park², Jinkyu Roh², Songwen Tan², Dong June Ahn³, Chunzhi Cui³.

1, KU-KIST Graduate School of Converging Science and Technology, Korea University, Seoul, Korea (the Republic of); 2, , Korea University, Seoul, Korea (the Republic of); 3, Dept of Chemical & Biological Engr, Korea Univ, Seoul, Korea (the Republic of).

Show Abstract

8:00 PM - GG5.21

Bioelectric Stress Field Induced Cell Deformation in an Electric Field Stimulated Medium

Ravikumar Krishnamurthy¹, V Kumaran¹, Bikramjit Basu¹.

1, , Indian Institute of Science, Bangalore, Bangalore, KA, India.

Show Abstract

8:00 PM - GG5.22

Dynamics of Biomolecular Interactions on Nanoparticles in Flow Fields

Hanzhe Liu², Jeahoon Lim¹, Kookheon Char¹, Dong June Ahn².

1, , Seoul National Univ, Seoul, Korea (the Republic of); 2, , Korea Univ, Seoul, Korea (the Republic of).

Show Abstract

8:00 PM - GG5.23

Characterization of Dipeptide-based Sorbent Materials Using Combined Thermodynamic and Inelastic Neutron Scattering Techniques

Daniele Paradiso¹, Enrico Perelli Cippo², Giuseppe Gorini³, Giorgio Rossi⁴, John Z. Larese¹.

1, Department of Chemistry, University of Tennessee, Knoxville, Tennessee, United States; 2, , CNR - IFP, Milano, Italy; 3, Department of Physics, Milano-Bicocca University, Milano, Italy; 4, Department of Physics, Università degli Studi di Milano, Milano, Italy.

Show Abstract

8:00 PM - GG5.24

Control of Neurosphere Size by Using Spheroform Three-Dimensional Cell Culture System

Seung-Hyun Kim¹, Jae-Hyung Jang¹, Haeshin Lee².

1, , Yonsei University., Seoul, Korea (the Republic of); 2, , KAIST, Daejeon, Korea (the Republic of).

Show Abstract

8:00 PM - GG5.25

Synthesis and Application of Pt Nanoparticles Supported on Functionalized Mesoporous Silica in Biosensing Devices as a Peroxidase Mimetic System

Camila Marchetti Maroneze¹, Vitoria Moraes¹, Glauco Pilon dos Santos¹, Lauro Tatsuo Kubota¹.

1, , Institute of Chemistry, State University of Campinas, Campinas, Brazil.

Show Abstract

8:00 PM - GG5.26

Solid State Nanopore Characterization and Conductance Effect on DNA Translocation

Salva Salmani Rezaie^{1 2}, Manisha Gupta^{4 2}, Hiofan Hoi^{1 2}, Carlo Montemagno^{1 2 3}.

1, Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada; 2, , Ingenuity lab, Edmonton, Alberta, Canada; 3, , National Institute for Nanotechnology, Edmonton, Alberta, Canada; 4, Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta, Canada.

Show Abstract

8:00 PM - GG5.27

Selective, Long-Term Transfection of Dividing and Non-Dividing Cells using Plasmid DNA-Loaded Mesoporous Silica Nanoparticle-Supported Lipid Bilayers

Eric C. Carnes¹, Katharine Epler¹, David Patrick Padilla², Christopher Lino¹, Brandon Slaughter¹, Marissa R. Anderson¹, Patrick Fleig¹, C. Jeffrey Brinker^{1,2}, Carlee Ashley¹.

¹, Sandia National Laboratories, Albuquerque, New Mexico, United States; ², University of New Mexico, Albuquerque, New Mexico, United States.

Show Abstract

8:00 PM - GG5.28

Facile Approach for Detection of Fungicide Residues from Grape Extract

Jon Engel Craven¹, Emily Chin¹, Shalini Prasad².

¹, The University of Texas at Dallas, Richardson, Texas, United States; ², Bioengineering, The University of Texas at Dallas, Richardson, Texas, United States.

Show Abstract

8:00 PM - GG5.29

MoS₂ Biomining Using Inorganic Binding Peptides

Sibel Cetinel^{1,2}, Prasanna Bhomkar³, Feng Wang³, Weizheng Shen^{1,2}, Carlo Montemagno^{1,2}.

¹, Ingenuity Lab, Edmonton, Alberta, Canada; ², Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada; ³, National Institute of Nanotechnology (NINT), University of Alberta, Edmonton, Alberta, Canada.

Show Abstract

8:00 PM - GG5.30

Antibacterial Activity of Natural Extracts Incorporated Nanoclays

Hyoung-Jun Kim¹, In-Kee Hong², Eun-Ji Kim², Jeong-Eun Park², Jae-Min Oh¹.

¹, Department of Chemistry and Medical Chemistry, College of Science and Technology, Yonsei University, Wonju, Gangwondo, Korea (the Republic of); ², G-Tech Village, Radiant, INC., Geodu-ri, Dongnae-myeon, Chuncheon, Gangwondo, Korea (the Republic of).

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8:00 PM - GG5.31

Antimicrobial Peptides as Nature Defense Fighters at Implant Materials Interfaces

Kyle Boone¹, Deniz Yucesoy², Sarah VanOosten¹, Dmytro Khvostenko¹, Esra Yuca¹, Candan Tamerler¹.

¹, Bioengineering, University of Kansas, Lawrence, Kansas, United States; ², University of Washington, Seattle, Washington, United States.

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8:00 PM - GG5.32

Interaction Between Food Grade TiO₂ and SiO₂ Nanomaterials and Biological Species in Suspension State

Jae-Ho Song¹, Kyoung-Min Kim¹, Jae-Min Oh¹.

¹, Department of Chemistry and Medical Chemistry, Yonsei University, Wonju, Gangwondo, Korea (the Republic of).

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8:00 PM - GG5.33

Label-Free Rapid Detection of Pathogens with Antimicrobial Peptide Assisted Impedance Spectrometry

Keren Jiang¹, Hashem Etayash², Sarfuddin Azmi², Garima Thakur¹, Selvaraj Naicker¹, Kamaljit Kaur², Thomas G. Thundat¹.

1, Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada; 2, Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta, Edmonton, Alberta, Canada.

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8:00 PM - GG5.34

Antimicrobial Cotton: Covalent Bonding of Silver Nanoparticles to Electrospun Cotton Fibers

Yingying Zheng², Chao Cai¹, Fuming Zhang¹, Jonathan Monty¹, Robert Linhardt¹, Trevor J Simmons¹.

1, , Rensselaer Polytechnic Institute, Troy, New York, United States; 2, Physics and Key Laboratory of ATMMT Ministry of Education, Zhejiang Sci-Tech University, Hangzhou, China.

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8:00 PM -

GG5.35 WITHDRAWN

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8:00 PM - GG5.36

Eliciting Specific Cell/Surface Interactions: Non-Fouling Surfaces Decorated with Integrin Ligands

Ongen Pop-Georgievski¹, Ilya Kotelnikov¹, Katarina Novotna², Vladimir Proks¹, Jana Musilkova², Lucie Bacakova², Frantisek Rypacek¹.

1, Biomaterials and Bioanalogous Polymer Systems, Institute of Macromolecular Chemistry - Prague, ASCR, Prague 6, Czech Republic, Czech Republic; 2, Biomaterials and Tissue Engineering, Institute of Physiology, ASCR, Prague 4, Czech Republic, Czech Republic.

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8:00 PM - GG5.37

Nano-Boron as an Antibacterial Agent for Functionalized Textiles

Ayşe Karagoz¹, Wazir Akbar¹, Mohamed Noor³, Katarzyna Kowal³, Tofail Syed³, Bahar G. Basim², Merve Unluagac⁴, Gokmen Ukelge⁴, Jacob Lum⁵.

1, , Ozyegin University, Istanbul, Turkey; 2, Nisantepi Mevki Orman Sk, Ozyegin Univ, Istanbul, Turkey; 3, Chemical and Environmental Sciences Department/Materials & Surface Science, University of Limerick, Limerick, Ireland; 4, , Kivanc Textile, Adana, Turkey; 5, Department of Chemical Engineering, Oregon State University, Corvallis, Oregon, United States.

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8:00 PM - GG5.38

Rapid Fabrication Technique for Development of Innovative Polyelectrolyte Biomaterial Systems

Shalini Saxena², Ashley Carson Brown⁴, Miguel Fernandez³, Alberto Fernandez-Nieves³, L. Andrew Lyon¹ 4.

1, Schmid College of Science and Technology, Chapman University, Orange, California, United States; 2, School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, Georgia, United States; 3, School of Physics, Georgia Institute of Technology, Atlanta, Georgia, United States; 4, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, Georgia, United States.

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8:00 PM - GG5.39

Nanoporous Gold Films for Electrochemical Nucleic Acid Biosensing

Pallavi Daggumati¹, Zimple Matharu¹, Erkin Seker¹.

1, Electrical Engineering, UC Davis, Davis, California, United States.

Show Abstract**8:00 PM - GG5.40**

Superhydrophilic and Underwater Superoleophobic PEG Cryogel Membrane for Effective Oil/Water Separation

Yanhua Zhao¹, Zuankai Wang¹.

¹, , City University of Hong Kong, HongKong, Hong Kong.

Show Abstract**8:00 PM - GG5.41**

Hybrid Nanopore with Improved Stability

Hiofan Hoi¹, Manisha Gupta⁴, Salva Salmani Rezaie¹, Sinoj Abraham², Yuan He², Andrew Jo¹, Valentyna Semenchenko⁵, Jeffrey Germain¹, Carlo Montemagno³ ⁵ ¹.

¹, Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, Canada;

², , University of Alberta, Edmonton, Alberta, Canada; ³, National Inst of Nanotech, Univ of

Alberta, Edmonton, Alberta, Canada; ⁴, Department of Electrical and Computer Engineering, University of

Alberta, Edmonton, Alberta, Canada; ⁵, , Ingenuity Lab, Edmonton, Alberta, Canada.

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2015-04-09

Symposium GG**Show All Abstracts****Symposium Organizers**

- Yuhei Hayamizu, Tokyo Institute of Technology
- Hendrik Heinz, University of Akron
- Carole Perry, Nottingham Trent University
- Candan Tamerler, University of Kansas

GG6: Adhesion and Self Assembly

- Chair: Carole Perry
- Chair: Hendrik Heinz
- Thursday AM, April 9, 2015
- Park Central Hotel, 2nd Floor, Metropolitan III

8:00 AM - *GG6.01

Slippery Interfaces: A New Concept in Anti-Biofouling Material

Joanna Aizenberg³, Caitlin Howell¹, Stefan Kolle³, Philseok Kim².

¹, SEAS, Harvard Univ, Cambridge, Massachusetts, United States; ², Wyss Inst, Harvard

Univ, Cambridge, Massachusetts, United States; ³, , Harvard University, Cambridge, Massachusetts, United States.

Show Abstract**8:30 AM - GG6.02**

Spectroelectrochemistry of Oxygen-Tolerant [NiFe]-Hydrogenase on Conductive Surfaces

Nina Heidary¹, Tillmann Utesch¹, Stefan Frielingsdorf¹, Oliver Lenz¹, Peter Hildebrandt¹, Maria Andrea Mroginski¹, Ingo Zebger¹, Anna Fischer² ¹.

¹, , Technische Universitaet, Berlin, Germany; ², , Albert Ludwigs Universitaet, Freiburg, Germany.

Show Abstract**8:45 AM - GG6.03**

Design Rules for Organized Molecular Architectures of Short Peptides on Atomically Flat Solids

David Alan Starkebaum¹, Tamon Page¹, Yuhei Hayamizu², Mehmet Sarikaya¹.

1, , University of Washington, Seattle, Washington, United States; 2, Organic and Polymeric Materials, Tokyo Institute of Technology, Tokyo, Japan.

Show Abstract**9:00 AM - *GG6.04**

The Consequences of Water between Two Hydrophobic Surfaces on Adhesion and Wetting

Adrian Defante¹, Tarak Burai¹, Matt Becker¹, Ali Dhinojwala¹.

1, Department of Polymer Science, The University of Akron, Akron, Ohio, United States.

Show Abstract**9:30 AM - GG6.05**

Learning New Adhesion Lessons from Pollen Bioparticles

Carson Meredith¹, Haisheng Lin¹.

1, , Georgia Tech, Atlanta, Georgia, United States.

Show Abstract**9:45 AM -**

BREAK

Show Abstract**10:15 AM - GG6.06**

Molecular Simulation of Adhesion Property Recovery in the Cellulose/Phenolic Adhesive Interface: The Role of Water Molecules

Lik-ho Tam¹, Denvin Lau¹.

1, , City University of Hong Kong, Hong Kong, Hong Kong.

Show Abstract**10:30 AM - GG6.07**

New Bio-Adhesive Chemistries

Vishal Mogal¹, Terry Steele¹.

1, , Nanyang Technological University, Singapore, Singapore.

Show Abstract**10:45 AM - *GG6.08**

Oligonucleotide Nanotechnology for Materials, Devices, and Therapeutics

William Andrew Goddard¹, Si-Ping Han¹.

1, , California Institute of Technology, Pasadena, California, United States.

Show Abstract**11:15 AM - GG6.09**

Studying the Interaction Between Graphene and Peptides

Steve S Kim¹, Yen Ngo¹, Zhifeng Kuang¹, Barry Farmer¹, Rajesh Naik¹.

1, , AFRL, Wpafl, Ohio, United States.

Show Abstract**11:30 AM - GG6.10**

Slippery Surfaces for Marine Fouling Applications

Stefan Kolle^{1,2}, Onyemaechi Ahanotu², Philseok Kim², Elisa Maldonado³, James Weaver², Alexander Tesler¹, Shane Stafslie⁴, Joanna Aizenberg¹.

1, SEAS, Harvard University, Cambridge, Massachusetts, United States; 2, Wyss Institute, Harvard, Cambridge, Massachusetts, United States; 3, , UC San Diego, San Diego, California, United States; 4, Center for Nanoscale Science and Engineering, NDSU, Fargo, North Dakota, United States.

Show Abstract**11:45 AM - GG6.11**

MP-SPR - A New Optical Characterization Method For Molecular Interaction and Ultrathin Films

Niko Markus Granqvist¹, Annika Jokinen¹, Janusz Sadowski¹, Johana Kuncova-Kallio¹.

1, , BioNavis, Ylojarvi, Finland.

Show Abstract**GG7: Applications and Devices in Materials and Medicine**

- Chair: Yuhei Hayamizu
- Chair: Candan Tamerler
- Thursday PM, April 9, 2015
- Park Central Hotel, 2nd Floor, Metropolitan III

1:30 PM - GG7.01

Protein Coated Isotropic and Anisotropic Metal Nanoparticles: A Defined Bio-Interface on Nanomaterials

Moritz Tebbe¹, Olga Isakin¹, Roland Hoeller¹, Christian Kuttner¹, Andreas Fery¹, Munish Chanana¹.

1, , University of Bayreuth, Bayreuth, Germany.

Show Abstract**1:45 PM - GG7.02**

Optimising the Solubility of Bioactive Phosphate Glass for Drug Delivery

Jamieson Christie¹, Marta Corno², Massimo delle Piane², Piero Ugliengo², Nora de Leeuw¹.

1, , University College London, London, United Kingdom; 2, Chemistry, Universita di Torino, Torino, Italy.

Show Abstract**2:00 PM - GG7.03**

Engineered Microstructure Hydroxyapatite Granules for Tailored Drug Release Rate

Min-Ho Hong¹, Seong Yi¹, Heonjin Choi¹.

1, , Yonsei University, Seoul, Korea (the Republic of).

Show Abstract**2:15 PM - *GG7.04**

Protein-Based Nano-Structure Fabrication: The Bio Nano Process

Ichiro Yamashita¹.

1, , Nara Institute of Science and Technology, Ikoma, Japan.

Show Abstract**2:45 PM -**

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3:15 PM - GG7.05

Electrowetting on Bio-Inspired Soft Liquid-Infused Film (EWOLF): Complete Reversibility and Controlled Droplet Oscillation Suppression for Fast Optical Imaging

Chonglei Hao¹, Zuankai Wang¹.

1, , City University of Hong Kong, Hong Kong, Hong Kong.

Show Abstract

3:30 PM - GG7.06

Biologically-Templated Nanomolecular Probes for High-Resolution In Vivo Sensing and Detection

Neelkanth M Bardhan¹, Xiangnan Dang¹, Angela M. Belcher¹.

1, Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States.

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3:45 PM - *GG7.07

The Nexus of Energy, Water, Health and Food: Thinking Small to Solve Global Quality of Life Challenges

Carlo Montemagno¹.

1, National Institute of Nanotechnology, University of Alberta, Edmonton, Alberta, Canada.

Show Abstract

4:15 PM - GG7.08

In-Situ Manipulation of Droplet Motions on Bio-Inspired Superhydrophobic Surfaces for Advanced Lab-on-a-Chip Platform

Jungmok Seo¹, Seung-Ki Lee¹, Jaehong Lee¹, Jung Seung Lee², Seung-Woo Cho², Jong-Hyun Ahn¹, Taeyoon Lee¹.

1, School of Electrical and Electronic Engineering, Yonsei University, Seoul, Korea (the Republic of); 2, Department of Biotechnology, Yonsei University, Seoul, Korea (the Republic of).

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4:30 PM - GG7.09

Investigation of High-Aspect Ratio Nanoelectrodes for Improved Cell-Chip Coupling and In-Cell Recordings

Jan Schnitker¹, Francesca Santoro^{1 2}, Andreea Belu¹, Gregor Panaitov¹, Elmar Neumann¹, Bernhard Wolfrum¹, Andreas Offenhaeusser¹.

1, , FZ Jülich, Jülich, Germany; 2, , Stanford University, Stanford, California, United States.

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4:45 PM - GG7.10

Carbon Nanotube Porins: Synthesis, Characterization and Ensemble Transport Properties

Kyunghoon Kim^{1 2 3}, Jia Geng^{1 3 4}, Ramya Tunuguntla^{1 3}, Luis R. Comolli⁵, Costas P Grigoropoulos², Caroline Ajo-Franklin³, Aleksandr Noy^{1 3 4}.

1, Biology and Biotechnology Division, Lawrence Livermore National Laboratory, Livermore, California, United States; 2, Mechanical Engineering Department, University of California at Berkeley, Berkeley, California, United States; 3, The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, California, United States; 4, School of Natural Sciences, University of California at Merced, Merced, California, United States; 5, Life Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, California, United States.

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2015-04-10**Symposium GG****Show All Abstracts****Symposium Organizers**

- Yuhei Hayamizu, Tokyo Institute of Technology
- Hendrik Heinz, University of Akron
- Carole Perry, Nottingham Trent University
- Candan Tamerler, University of Kansas

GG8: Tunable Interfaces

- Chair: Yuhei Hayamizu
- Chair: Hendrik Heinz
- Friday AM, April 10, 2015
- Moscone West, Level 3, Room 3006

8:15 AM - GG8.00

Intrinsic and Induced Chirality of CdSe Nanocrystals

Maria Mukhina¹, Vladimir Maslov¹, Alexander Baranov¹, Anatoly Fedorov¹, Finn Purcell Milton², Yurii Gun'ko^{1, 2}.

¹, ITMO University, Saint Petersburg, Russian Federation; ², University of Dublin, Trinity College, Dublin, Ireland.

Show Abstract**8:30 AM - GG8.01**

Bioinspired Compatibilization of Internal Material Interfaces in Composite Materials

Valeria Samsoninkova^{1, 2}, Felix Hansske², Wolfgang Wagermaier², Hans Boerner¹.

¹, Humboldt Universität zu Berlin, Berlin, Germany; ², Max-Planck Institute of Colloids and Interfaces, Potsdam, Germany.

Show Abstract**8:45 AM - *GG8.02**

Penetration of a Massive Volume of Water between 2D Oxide Layers
Penetration of a Massive Volume of Water between 2D Oxide Layers

Takayoshi Sasaki¹.

¹, National Institute for Materials Science, Tsukuba, Ibaraki, Japan.

Show Abstract**9:15 AM - GG8.03**

Understanding Binding Affinity of Peptides to Graphene Surfaces as a Function of Concentration using Atomistic Simulation and Experiment

Amanda Garley², Vikas Varshney¹, Corrinne Welch¹, Rajiv J. Berry¹, Rajesh Naik¹, Hendrik Heinz².

¹, Air Force Research Laboratory, Dayton, Ohio, United States; ², University of Akron, Akron, Ohio, United States.

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9:30 AM - GG8.04

Single Molecular Layer Adaption of Interfacial Surfaces by Cyclic Azasilane "Click-Chemistry"

Annalese F Maddox¹, Janis G Matisons¹, Mani Singh¹, Barry Arkles¹, Youlin Pan¹.

¹, , Gelest Inc., Morrisville, Pennsylvania, United States.

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9:45 AM -

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10:15 AM - GG8.05

Brush-Hydrogels with Graded and Gradient-Like Properties: From Organic to Hybrid Biomimetic Coatings

Ella Shafagh Dehghani¹, Nicholas Spencer², Edmondo Benetti² ³.

¹, , ETHZ, Laboratory for Surface Science and Technology, Zürich, Switzerland; ², , ETH Zurich, Zürich, Switzerland; ³, , University of Twente, Enschede, Netherlands.

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10:30 AM - *GG8.06

The Unified Contact Angle Model (UCAM) for Fabricating Designer Surfaces for Quantitative Control of Contact Angles and Wetting Behavior

Jacob N. Israelachvili¹, Yair Kaufman¹, Himanshu Mishra¹, Szu-Ying Chen¹, Saurabh Das¹, Adair Gallo², Alex Schrader¹, Dong Woog Lee¹.

¹, , University of California Santa Barbara, Santa Barbara, California, United States; ², Ministry of Education of Brazil, CAPES Foundation, Brasilia, Brazil.

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11:00 AM - GG8.07

Characterizing the Organization and Investigating the Conformation of Peptide Self-Assembled Monolayers on Gold Nanoparticles: An Experimental and Computational Approach

Elena Colangelo¹.

¹, , Institute of Materials Research and Engineering, Singapore, Singapore.

Show Abstract

11:15 AM - GG8.08

Design of Biomimetic Surfaces to Interrogate the Role of Glycosaminoglycans in Chemokine-Induced Myoblast Behaviour

Dhruv Thakari², Elisa Migliorini¹ ², Fabien Dalonneau³, Rabia Sadir⁴, Olivier Renaudet¹ ², Hugues Lortat-Jacob⁴, Didier Boturyn¹ ², Liliane Coche-Guerente¹ ², Catherine Picart³, Ralf Richter¹ ² ⁵.

¹, , Univ. Grenoble Alpes, DCM, Grenoble, France; ², , CNRS, DCM, Grenoble, France; ³, , UMR 5628 (LMGP), CNRS and Grenoble Institute of Technology, Minatec, Grenoble, France; ⁴, , Institut de Biologie Structurale UMR CEA-CNRS-UJF 5075, Univ. Grenoble Alpes, SAGAG Group, Grenoble, France; ⁵, , CIC biomaGUNE, San Sebastian, Spain.

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11:30 AM - GG8.09

Adsorption Behaviors of Key Serum Proteins on Nanostructured Biomaterials: A Perspective from Visualizing Their Conformations

Hua Li¹, Yi Liu¹, Jing Huang¹.

1, , Ningbo Institute of Materials Technology & Engineering, CAS, Ningbo, China.

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11:45 AM - GG8.10

Interactions of Biomolecular Antioxidants with Lipid and Protein Tissue Components

Jacob R. Bow1, Krysta Biniek1, Reinhold H. Dauskardt1.

1, , Stanford University, Stanford, California, United States.

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GG9: Medical Applications

- Chair: Candan Tamerler
- Chair: Yuhei Hayamizu
- Friday PM, April 10, 2015
- Moscone West, Level 3, Room 3006

1:30 PM - GG9.01

Advanced 1D Nanomaterial-Assisted Electroporation for Novel Bacteria and Viruses Disinfection

Chong Liu1, Xing Xie2, Wenting Zhao1, Yi Cui1 3.

1, MSE, Stanford University, Stanford, California, United States; 2, CEE, Stanford University, Stanford, California, United States; 3, SLAC, Stanford University, Stanford, California, United States.

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1:45 PM - *GG9.02

The Distinct Adsorption Profiles of Exosomes on Various Inorganic Materials

Sachiko Matsumura1, Tamiko Minamisawa1, Kanako Suga1, Kiyotaka Shiba1.

1, , Cancer Institute, JFCR, Tokyo, Japan.

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2:15 PM - GG9.03

Direct Intracellular Delivery of Synthetic Biomolecules Using Nanostraws

Alexander Xu1, Amin Aalipour1, Nicolas A Melosh1.

1, Department of Materials Science, Stanford University, Stanford, California, United States.

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2:30 PM - GG9.04

Development of an Adenovirus Liposomal Encapsulation Method to Improve Viral Gene Therapy

Natalie Mendez1, Vanessa Herrera1, Lingzhi Zhang1, Farah Hedjran1, William Trogler2, Sarah Blair1, Tony Reid1, Andrew C. Kummel2.

1, , University of California, San Diego, La Jolla, California, United States; 2, Dept Of Chemistry, Univ of California-San Diego, La Jolla, California, United States.

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3:15 PM - GG9.05

3D Protein Gradients on Scaffolds for Tissue Engineering: A Polymer Brush-Assisted Fabrication

Edmondo Maria Benetti^{1,2}, Michel Klein Gunnewiek², Andrea Di Luca³, Clemens van Blitterswijk³, G. Julius Vancso², Lorenzo Moroni³.

1, , Swiss Federal Institute of Technology ETH Zürich, Zürich, Switzerland; 2, Materials Science and Technology of Polymers, University of Twente, Enschede, Netherlands; 3, Department of Tissue Regeneration, University of Twente, Enschede, Netherlands.

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3:30 PM - *GG9.06

Scaffolds for Bone Tissue Engineering

Antoni P. Tomsia¹.

1, Div Matls Science, Lawrence Berkeley National Lab, Berkeley, California, United States.

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4:00 PM - GG9.07

High-Throughput Fabrication of Micropatterned Polymeric Nanowire Arrays for High-Resolution Drug Loading and Topographical Cellular Control

Cade B. Fox¹, Jean Kim², Erica B. Schlesinger², Hariharasudhan D. Chirra¹, Tejal A. Desai^{1,2}.

1, Bioengineering and Therapeutic Sciences, University of California, San Francisco, San Francisco, California, United States; 2, Bioengineering, UC Berkeley & UCSF, San Francisco, California, United States.

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4:15 PM - GG9.08

Tuning the Fate of Stem Cells by Using Physical Signals from Biomaterials

Hong Liu^{1,2}, Xiaoning Mou¹, Jianhua Li^{2,1}.

1, , Beijing Institute of Nanoenergy and Nanosystems, CAS, Beijing, China; 2, , State Key Laboratory of Crystal Materials, Shandong University, Jinan, China.

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4:30 PM - GG9.09

Breast Cancer Detection using Charge Sensors Coupled to DNA Monolayer

Marina Ribeiro Batistuti¹, Paulo Roberto Bueno², Marcelo Mulato¹.

1, , University of São Paulo, Ribeirão Preto, Brazil; 2, Physical Chemistry, Universidade Estadual Paulista "Júlio de Mesquita Filho", Araraquara, São Paulo, Brazil.

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4:45 PM - GG9.10

Engineering of Bacterial Biofilms by Substrate Topography

Arunima Bhattacharjee¹, Allon Hochbaum¹.

1, , University of California, Irvine, Irvine, California, United States.

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