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Meeting Abstracts —MA2014-02

2014 ECS and SMEQ Joint International Meeting

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[562Plasmon Induced Resonant Energy Transfer and Hot Electron Injection in Plasmon Enhanced Photocatalysis](#)

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[563Plasmonic Solar Fuels Based on Nanostructured Oxide Photocatalysts](#)

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599[Comparison of the Photocatalytic and Photoelectrocatalytic Methyl Orange Color Removal over \$\text{TiO}_{\(2-x-y\)}\text{N}_x\text{F}_y\$](#)

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600[Removal of Heavy Metal Ions by Photoelectrodeposition in Aqueous Solutions](#)

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602[Advanced Redox Flow Battery Technology](#)

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603[In Situ Localized Current Distribution in a Vanadium Redox Flow Battery](#)

[Jason T. Clement, Thomas A. Zawodzinski, Matthew M. Mench](#)

604[Commercializing the Chloride-Containing All Vanadium Redox Flow Battery](#)

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605[Cell Performance Improvement By Surface Modification of Porous Carbon Electrodes in Vanadium Redox Flow Battery](#)

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606[High Power Density Vanadium Flow Batteries with Laser-Cut Flow Field Patterns on Carbon Paper Electrodes](#)

[Ertan Agar, Christopher R Dennison, Emin Caglan Kumbur](#)

607[The Influence of Electrode and Channel Configurations on Flow-Battery Performance](#)

[Robert M. Darling, Mike L. Perry](#)

608A [Novel in-Situ Synchrotron XANES Technique to Study All Vanadium Redox Flow Battery](#)

[Qi Liu, Chengjun Sun, Fan Yang, Yang Ren, Steve M Heald, Jian Xie](#)

609[Research and Development of Vanadium Flow Battery](#)

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611[Electrochemical Analysis of Chromium Acetylacetonate for Nonaqueous Flow Batteries](#)

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613Membrane and Electrode Effects in the Br₂ – H₂ Redox Flow Cell

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614Advanced Hydrogen-Bromine Flow Battery for Energy Storage

Guangyu Lin, Pau Ying Chong, Trung Van Nguyen, Jahangir Masud, Ryszard Wycisk, Peter N. Pintauro

615New Development in the Alkaline-Based Hydrogen-Bromine Fuel Cell

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616Aqueous Manganese-Based Electrolytes for Redox Flow Batteries

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617Effect of Morphology and Size of Nickel Particles on Electrochemical Performance of Sodium Metal Chloride Rechargeable Battery

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618Further In Situ EDXRD Studies of the MnO₂ Cathode

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620 [A Metal-Free Organic Aqueous Capacitor Using Quinonic Compounds Couple](#)

[Daiki Komatsu, Takaaki Tomai, Itaru Honma](#)

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622 [Development of a Planar Sodium Sulfur Cell](#)

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[630GPU-Accelerated Pore-Scale Transport Resolved Model for Flow-Assisted Battery Design](#)

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636 Miniaturization of Photothermal Cantilever Deflection Spectroscopy with an Electrical Readout

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637 Development of CD Based Micro-Fluidics Device for High Throughput Particle Capture and Sampling

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639 Hybrid Porous Silicon- Rhodamine B Derivative Nanostructures as Chemical Sensor for Hg(II) Detection

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640 Sensor for Quantitative Analytical Determination of Sulphite in Wine Using a System of Modified Electrode and a Membrane Absorption System

Roxana Arce, María Jesús Aguirre, Julio Romero

641 Electrochemical Determination of Serotonin, in the Presence of Dopamine at a Carbon Paste Electrode Modified with Aunps-Bcd

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[653Rational Design of Amperometric Gas Sensors with Ionic Liquid Electrolytes](#)

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[654Mixed-Potential NO_x and NH₃ Sensors Fabricated by Commercial Manufacturing Methods](#)

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[655Influence of Au Nanoparticle Surface Decoration on Highly Oriented SnO₂ Nanorods/ZnO Hybrid Films for Gas Sensing Improved Performance](#)

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659 [Potentiometric Glycerol Biosensor Based On Immobilization Of Glycerol-Dehydrogenase On Au Using A Molecular Wiring System](#)

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660 [Cell-Based Sensing: From 2D to 3D Cell Culture](#)

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[665Discriminative Detection of Neurotoxins by a Layer-by-Layer Based Carbon Nanotube/bi-enzyme Biosensor](#)

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[Shin Horikawa, Yating Chai, Howard Clyde Wikle, Bryan A. Chin](#)

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675 [Use of Personal Glucose Meters for the Detection of E. Coli in Water](#)

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[1636Invited; Stress and Doping Impact on Intrinsic Point Defect Behavior in Growing Single Crystal Silicon](#)

[Koji Sueoka, Eiji Kamiyama, Jan Vanhellemont](#)

[1637Absolute Value Determination of Vacancy Concentration in Silicon Crystals Using Low-Temperature Ultrasonic Measurements](#)

[Hiroshi Yamada-Kaneta, Kazuki Okabe, Mitsuhiro Akatsu, Shotaro Baba, Keisuke Mitsumoto, Yuichi Nemoto, Terutaka Goto, Hiroyuki Saito, Kazuhiko Kashima, Yoshihiko Saito](#)

[1638Highly Sensitive and Accurate Infrared Absorption Measurement of Carbon Concentration in Si Crystal](#)

[Naohisa Inoue, Kaori Watanabe, Hirofumi Seki, Hiroyuki Uno, Hidenori Oyama, Yuichi Kawamura](#)

[1639Invited; Oxygen Precipitation and Defect Generation in Cz Silicon during Second and Millisecond Annealing](#)

[Gudrun Helga Kissinger, Dawid Kot, Markus Andreas Schubert, Andreas Sattler](#)

[1640Invited; Modeling of Oxygen Precipitation in Silicon](#)

[Scott T. Dunham, Bart C. Trzynadlowski](#)

[1641Precipitation Behaviors of Rapid Thermal Annealing Treated Silicon Wafers under Various Thermal Cycles](#)

[DongMyun Lee, TaeHyeong Kim, SoonSung Park, TaeHoon Kim, YongHyun Lee, EunSik Park, Hwankug Yeo, Robert Falster](#)

1642 [Morphology of Oxygen Precipitates in RTA Pre-Treated Czochralski Silicon Wafers Investigated by FTIR Spectroscopy and STEM](#)

[Dawid Kot, Gudrun Kissinger, Markus Andreas Schubert, Andreas Sattler](#)

1643 [Proximity Gettering of Copper via Oxygen Precipitates for Silicon-on-Insulator Wafer](#)

[Jun-Seong Park, Il-Hwan Kim, Gon-Sub Lee, Jea-Gun Park](#)

1644 [Keynote: Epitaxy-Based Strain-Engineering Methods for Advanced Devices](#)

[Detlev Grützmacher, Stephan Wirths, Torsten Rieger, Dan Buca, Toma Stoica, Mihail Ion Lepsa, Qing-Tai Zhao, Siegfried Mantl](#)

1645 [Keynote: Material Challenges and Opportunities in Ge/III-V Channel MOSFETs](#)

[Shinichi Takagi, Sang-Hyeon Kim, Masafumi Yokoyama, Koichi Nishi, Rui Zhang, Mitsuru Takenaka](#)

1646 [Invited: First-Principles Studies of the Defect Formation in III-V FETs Grown by Fin Replacement Method](#)

[Hideki Minari, Shinichi Yoshida, Ken Sawada, Masashi Nakazawa, Matty Caymax, Clement Merckling, Niamh Waldron, Weiming Guo, Sijia Jiang, Nadine Collaert, Eddy Simoen, D Lin, Geoffrey Pourtois](#)

1647 [Profiling of Border Traps at GeSn and High-K Oxide Interface](#)

[Somya Gupta, Eddy Simoen, Adam Dobri, Henk Vrielinck, Johan Lauwaert, Clement Merckling, Federica Gencarelli, Yosuke Shimura, Roger Loo, Marc Heyns](#)

1648 [Invited: The Impact of a \(Si\)Ge Heterojunction on the Analog Performance of Vertical Tunnel FETs](#)

[Paula Ghedini Der Agopian, J. A. Martino, Anne Vandooren, Rita Rooyackers, Eddy Simoen, Aaron Thean, Cor Claeys](#)

1649 [Invited; Ge-on-Insulator MOSFETs for High-Performance and 3D-LSI Applications](#)

[Tsutomu Tezuka, Keiji Ikeda, Yoshiki Kamata, Yuuichi Kamimuta, Koji Usuda, Yoshihiko Moriyama, Mizuki Ono, Masahiro Koike, Minoru Oda, Toshifumi Irisawa, Eiko Mieda, Tatsuro Maeda, Wipakorn Jevasuwan, Yuichi Kurashima, Hideki Takagi, Kiyoe Furuse, Etsuo Kurosawa](#)

1650 [Invited; Solid Phase Epitaxy of GeSn Alloys on Silicon and Integration in MOSFET Devices](#)

[Ruben R. Lieten, Tatsuro Maeda, Jin Won Seo, Wipakorn Jevasuwan, Hiroyuki Hattori, Noriyuki Uchida, Shu Miura, Masatoshi Tanaka, Claudia Fleischmann, Andre Vantomme, Brett C. Johnson, Jean-Pierre Locquet](#)

1651 [Invited; Alternative High n-Type Doping Techniques in Germanium](#)

[Giovanni Capellini, Wolfgang M. Klesse, Giordano Mattoni, Michelle Y. Simmons, Giordano Scappucci](#)

1652 [Deep-Level Defects in High-Dose Proton Implanted and High-Temperature Annealed Silicon](#)

[Moriz Jelinek, Johannes Laven, Mathias Rommel, Werner Schustereder, Hans-Joachim Schulze, Lothar Frey, Reinhart Job](#)

1653 [Formation of Shallow n-p Junctions in Cz-Si by Low-Energy Implantation of Carbon Ions](#)

[B. Romanyuk, V. Melnik, V. Popov, V. Litovchenko, V. Babich, V. Ilchenko, V. Kladko, J. Vanhellefont](#)

1654 [A New Method to Increase the Doping Efficiency of Proton Implantation in a High-Dose Regime](#)

[Moriz Jelinek, Johannes Laven, Reinhart Job, Werner Schustereder, Hans-Joachim Schulze, Mathias Rommel, Lothar Frey](#)

[1655 Modeling of Carbon Clustering and Associated Metal Gettering](#)

[Yu Jin, Scott T. Dunham](#)

[1656 Deep Levels in W-Doped Czochralski Silicon](#)

[Eddy Simoen, Koichiro Saga, Johan Lauwaert, Henk Vrielinck](#)

[1657 Ab Initio Analysis on Stability of Metal Atoms in \$\beta\$ -Si₃N₄/Si Structure](#)

[Daiki Shibata, Syunsuke Kobayashi, Koji Sueoka, Jun Komachi, Koichiro Saga](#)

[1658 Mn Related Defect Levels in Germanium](#)

[Johan Lauwaert, Filip Moens, Siegfried H. Segers, Karl Opsomer, Eddy Simoen, Jan Vanhellefont, Paul Clauws, Freddy Callens, Henk Vrielinck](#)

[1659 Electrical and Structural Properties of W-Capped Er Ohmic Contact to n-Type \$\text{In}_{0.53}\text{Ga}_{0.47}\text{As}\$ Channel](#)

[Chang-Hyun Leem, Min-Sung Kang, Ye-Ji Lee, Yi-Rang Lim, Kyu-Hwan Shim, Chel-Jong Choi](#)

[1660 Self-Aligned Ni-Germanide Ohmic Contact to n-Type GaAs Substrate for High Mobility III-V Channel Metal-Oxide Semiconductor Field-Effect Transistor \(MOSFET\)](#)

[Min-Sung Kang, Chang-Hyun Leem, Ye-Ji Lee, Yi-Rang Lim, Kyu-Hwan Shim, Chel-Jong Choi](#)

[1661 Invited; Positron Annihilation Spectroscopy on Open-Volume Defects in Group IV Semiconductors](#)

[Jonatan Slotte, Filip Tuomisto, Jiri Kujala, Andreas M. Holm, Natalie Segercrantz, Simo Kilpeläinen, Katja Kuitunen, Eddy Simoen, Federica Gencarelli, R Loo, Yosuke Shimura](#)

[1662 Invited; Synchrotron Radiation Based X-ray Microdiffraction of Advanced Semiconductor Materials](#)

[Akira Sakai](#)

1663 [Invited; Single Dislocations as Nanostructure Devices: Physics and Applications](#)

[Manfred Reiche, Martin Kittler, Hartmut Uebensee, Eckhard Pippel, Winfried Erfurth](#)

1664 [Temperature Dependent Young's Modulus of Si and Ge](#)

[Jan Vanhellemont, Akhilesh Kumar Swarnakar, Omer Van der Biest](#)

1665 [Invited; Nature of Point Defects at High-Mobility Semiconductor/Interfaces Probed by Electron Spin Resonance: Thermal GaAs/GaAs-Oxide Structures](#)

[Andre Stesmans, Sang Nguyen, Valery V Afanas'ev](#)

1666 [Invited; Light Induced Degradation in Compensated B-Doped Czochralski Silicon](#)

[Deren Yang](#)

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1667 [Fabrication of Uniform Sized Metal Spheres by Plasma Induced Dewetting](#)

[Dong-Hoon Han, Seung Moo Lee, Jung-Joong Lee, Dohyung Kim, Jinho Choi, Jaihyung Won](#)

1668 [Nuclear Forensics Using Plasma Source Ion Beams](#)

[Rod Boswell, Noel Smith, Christine Charles, Noel Martin, Paul Tesch](#)

1669 [Experiments and Modeling of Gas Heating in a Radio-Frequency Plasma Jet](#)

[Rod Boswell, Christine Charles, Amelia Greig, Sam Dixon](#)

1670 [Overcoming High Performance Semiconductor Packaging Challenges Using Plasma](#)

[David Foote](#)

1671 [Plasma Solutions for Life Sciences and Medical Device Manufacturing](#)

[David Foote](#)

1672 [Cryogenic Etching of Submicronic Features in Silicon Using Masks Based on Porous Polymer Films](#)

[Thomas Tillocher, Alexane Vitale, Marylene Vayer, Nicolas Gosset, Philippe Lefaucheux, Christophe Sinturel, Mohamed Boufnichel, Remi Dussart](#)

1673 [Plasma Etch in the Era of Atomic Scale Fidelity](#)

[Thorsten Lill, Harmeet Singh, Gowri Kamarthy, Keren J. Kanarik, Andy Cohen, Aaron Eppler, John Holland, Andreas Fischer, Meihua Shen, Jeff Marks, Richard A. Gottscho, Vahid Vahedi](#)

1674 [Alternative to \$H_3PO_4\$ for \$Si_3N_4\$ removal by using chemical downstream etching](#)

[Côme de Buttet, Olivier Gourhant, Stephane Zoll, Régis Bouyssou](#)

1675 [Ge FET Fabrication by Plasma Etch at 45nm Pitch](#)

[Alexey Milenin, Liebeth Witters](#)

1676 [Etch Challenges for 3D NAND Flash Technology](#)

[Anisul Haque Khan, Sunil Srinivasan, Jinhan Choi, Amulya Athayde, Raman Achutharaman](#)

1677 [HfO₂ Gate Stack Engineering by Post-Gate Cleaning Using NF₃/NH₃ Plasma](#)

[Min Seon Lee, Hoon Jung Oh, Joo Hee Lee, In Geun Lee, Woo Gon Shin, Sung Yong Kang, Dae Hong Ko](#)

P5-Processing Materials of 3D Interconnects, Damascene, and Electronics Packaging 6

Electronics and Photonics/Dielectric Science and Technology/Electrodeposition

1678[R&D Overview of 3D Integration Technology Using TSV in Japan](#)

[Morihiro Kada](#)

1679[5minutes TSV Filling](#)

[Chikara Funaahashi, Kazuo Kondo, Masayuki Yokoi, Naoki Okamoto, Takeyasu Saito](#)

1680[Low Cost, Scalable and Selective Electrochemical TSV Fill Technology for 3D IC Interconnects](#)

[Val M Dubin](#)

1681[3D Wafer Level Heterogeneous Integration](#)

[M Juergen Wolf, Klaus-Dieter Lang](#)

1682[A Stable Cu Nanoparticles Used for Seed Layer Deposition of through Silicon Via](#)

[Yao-Lin Tsai, Wei-Ping Dow](#)

1683[Effect of Cupric Methanesulfonate on through-Hole Filling by Copper Electroplating](#)

[Ji-Xun Ye, Wei-Ping Dow](#)

1684[Recent Progress in Cu Electrodeposition for TSV \(Through Silicon Via\)](#)

[Jae Jeong Kim, Myung Jun Kim, Seunghoe Choe, Kwang Hwan Kim, Hoe Chul Kim, Anna Lee](#)

1685[Kinetic Monte Carlo Simulation of Filling High-Aspect-Ratio through Silicon Via - III](#)

[Yutaka Kaneko, Yuki Fukiage, Akira Morita, Taro Hayashi, Kazuo Kondo, Katsuhiko Ohara, Fujio Asa](#)

[1686](#)[Plating through Hole with High Throwing Power Using Dual Levelers](#)

[Chia-Fu Hsu, Wei-Ping Dow, Su-Mei Huang](#)

[1687](#)[Through Silicon via Filling by Electroplating Using Reduced Graphene Oxide \(rGO\) as a Conducting Layer](#)

[Shih-Cheng Chang, Wei-Ping Dow](#)

[1688](#)[Through-Silicon-Via\(TSV\) Filling by Electrochemical Deposition with Pulse-Reverse Current](#)

[Snaghyun Jin, Bongyoung Yoo](#)

[1689](#)[Cryoetching of Silicon and Advanced Materials for 3D Interconnects](#)

[Remi Dussart, Thomas Tillocher, Nicolas Gosset, Philippe Lefauchaux, Rami L'jazouli, Mohamed Boufnichel, Liping Zhang, Jean-Francois de Marneffe, Mikhail Baklanov, Eiichi Nishimura, Koichi Yatsuda, Kaoru Maekawa](#)

[1690](#)[Electrografted Copper Seed Layer for High Aspect Ratio TSVs Interposer Metallization](#)

[Frédéric Gaillard, Thierry Mourier, Laurent Vandroux, Laurianne Religieux, Dominique Suhr, Frédéric Raynal, Vincent Mevellec](#)

[1691](#)[Electroless Plating for Seed Layer Deposition and Direct Metallization of Glass for Interposer Fabrication](#)

[Christopher Cordonier, Kyouhei Okabe, Hideo Honma](#)

[1692](#)[Low-Cost MEMS Packaging Using Sacrificial Polymer-Based In-Situ Airgap Creation](#)

[Erdal Uzunlar, Oluwadamilola Philips, Zhiyuan Zhu, Paul A Kohl](#)

[1693](#)[Advances in Wafer Bonding for 3D Integration and Other Applications](#)

[James J-Q Lu](#)

1694 [Anodic Oxidation of SPS Resulting in PDS Formation and the Influence of PDS on Electrolytic Copper Via Filling Performance](#)

[Ryoichi Kimizuka, Hisayuki Toda, Tetsuro Eda, Osamu Takai](#)

1695 [Numerical Analysis of the Correlation between the Cu⁺ Ion Concentration and the Current Density](#)

[Taro Hayashi, Kazuo Kondo, Masayuki Yokoi, Takeyasu Saito, Naoki Okamoto](#)

1696 [Bottom-up Copper Deposition in Damascene Features Using Alkali Electrolytes](#)

[Daniel Josell, Thomas P. Moffat](#)

1697 [Behavior of Cuprous Intermediate by RRDE](#)

[Kouhei Nishimura, Masayuki Yokoi, Kazuo Kondo, Taro Hayashi, Naoki Okamoto, Takeyasu Saito](#)

1698 [Degradation of Organic Additives and Its Influences on Cu Electrodeposition](#)

[Seunghoe Choe, Myung Jun Kim, Kwang Hwan Kim, Hoe Chul Kim, Anna Lee, Soo-Kil Kim, Jae Jeong Kim](#)

1699 [Electrodeposited Copper Wire for Transparent Conductive Film](#)

[Kazuo Kondo, Yuichi Ikeda, Masayuki Yokoi, Naoki Okamoto, Takeyasu Saito](#)

1700 [Applying the Co-Injection Test to Extract Difficult to Measure Process Parameters](#)

[Lindsay Boehme, Uziel Landau](#)

1701 [Development of Glyoxylic Acid Based Electroless Copper Deposition on Ruthenium](#)

[Fumihiko Inoue, Harold Philipsen, Marleen van der Veen, Silvia Armini, Stefaan Van Huylenbroeck, Herbert Struyf, Shoso Shingubara, Tetsu Tanaka](#)

[1702Cu Displacement Plating on Electroless Plated CoWB Layer on SiO₂ and Its Adhesion Property](#)

[Kohei Ohta, Fumihiko Inoue, Tomohiro Shimizu, Shoso Shingubara](#)

[1703Glyoxylic Acid as Reducing Agent for Electroless Copper Deposition on Cobalt Liner](#)

[Fumihiko Inoue, Harold Philipsen, Marleen van der Veen, Stefaan Van Huylenbroeck, Silvia Armini, Herbert Struyf, Shoso Shingubara, Tetsu Tanaka](#)

[1704Stability Evaluation of Non-Agglomerated Pd Nanoparticle Catalysts for Electroless Deposition](#)

[Noriaki Nakamura, Junichi Taniuchi, Takayuki Sone, Kotoe Sasaki, Fumihiko Inoue, Tomohiro Shimizu, Shoso Shingubara](#)

[1705Impurity in the Electroplated Sub-50nm Cu Lines](#)

[Qiang Huang, Alex Avekians, Shafaat Ahmed, Christopher Parks, Brett Baker-O'Neal, Sathana Kitayaporn, Asli Sahin, Ying Sun, Tien Cheng](#)

[1706Effect of Flow and Wafer Rotation on the Metallization of Copper Interconnects](#)

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[1707Electroless Deposition of Cu-Mn Alloy](#)

[Lu Yu, Rohan Akolkar](#)

[1708Barrier Metal Slurry for Low Defect Copper Damascene Chemical Mechanical Polishing](#)

[Hojoong Kim, Kyewon Seo, Jinok Moon, Hyunsoo Kim, Hasub Hwang](#)

[1709Case Study of Early Detection of Iron Contamination in Copper Damascene Plating Process by In-Situ Electrochemical Sensor](#)

[Aleksander Jaworski, Hanna Wikiel, Kazimierz Wikiel, Peter Holverson, Andrew Nelson](#)

[1710Electrodeposition and Characterisation of Novel Ni-NbO_x Composite Coatings as a Diffusion Barrier for Liquid Solder Interconnects - Part II: Diffusion Barrier Performance](#)

[Jing Wang, Geoffrey D Wilcox, Roger J Mortimer, Changqing Liu, Mark A Ashworth](#)

[1711Comparison of Cu-Sn Compound Formation Between Snag and Pure Sn Solder Bumps by EBSD](#)

[Ui-Hyoung Lee, Hyo-Jong Lee, Sang-Hyuk Kim, Chae-Min Park, Han Kyun Shin, Jong-yong Bae, Jaihyung Won](#)

[1712High Sensitivity, Positive Tone, Low-k Polynorborene Permanent Dielectric for Electronics Packaging](#)

[Brennen K Mueller, Jared Schwartz, Alexandra Sutlief, Paul A Kohl](#)

[1713On the Fabrication of Backside Illuminated Image Sensors: Bonding Oxide, Edge Trimming and CMP Rework Routes](#)

[Celso Cavaco, Lan Peng, Farid Sebaai, Greet Verbinen, Jakob Visker, Jan Olmen, Deniz Sabuncuoglu Tezcan, Haris Osman](#)

[1714Advanced Process Control of Nickel Electrodeposition for Packaging in Semiconductor Industry](#)

[Eugene Shalyt, Jingjing Wang, Vishal Parekh, Mchael MacEwan](#)

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1715[Invited: Glass-Glass Direct Bonding](#)

Gerhard Kalkowski, Stefan Risse, Uwe Zeitner, Frank Fuchs, Ramona Eberhardt, Andreas Tünnermann

1716Fracture Dynamics during the Silicon Layer Transfer of the Smart Cut™ Process

Damien Massy, Frédéric Mazen, Jennifer Ragani, Florence Madeira, Didier Landru, François Rieutord

1717Contact Behavior among Vertical Aligned Carbon Nanotube Bumps under Compression for Flexible Multilayer Substrates

Masahisa Fujino, Hidenori Terasaka, Tadatomo Suga

1718Nanomechanical Properties of Standard and Strained SOI Films Fabricated by Wafer Bonding and Layer Splitting

M A Mamun, Kai Zhang, Helmut Baumgart, A A Elmustafa

1719Invited: Heterointegration of Semiconductors: Challenges and Opportunities

Oussama Moutanabbir

1720Invited: SOI-Type Bonded Structures for Advanced Technology Nodes

Julie Widiez, Jean-Michel Hartmann, Frédéric Mazen, Sébastien Sollier, Christelle Veytizou, Yann Bogumilowicz, Emmanuel Augendre, Mickael Martin, Frédéric Gonzatti, Marie-Christine Roure, Julien Duvernay, Virginie Loup, Catherine Euvrard-Colnat, Aurélien Seignard, Thierry Baron, Romain Cipro, Franck Bassani, Anne-Marie Papon, Cyril Guedj, Isabelle Huyet, Maurice Rivoire, Pascal Besson, Christophe Figuet, Walter Schwarzenbach, Daniel Delprat, Thomas Signamarcheix

1721Epitaxial Growth and Layer Transfer of InP through Electrochemically Etched and Annealed Porous Buried Layers

Douglas Chen, Xiaolu Kou, Sahar Sareminaeni, M. S. Goorsky

1722Direct Bonding Mechanism of ALD-Al₂O₃ Thin Films

[Elodie Beche, Frank Fournel, Vincent Larrey, François Rieutord, Christophe Morales, Anne-Marie Charvet, Florence Madeira, Guillaume Audoit, Jean-Marc Fabbri](#)

1723 [Invited: Wafer Bonding: An Integration Route for Hybrid III-V/SiGe CMOS on 300mm](#)

[Lukas Czornomaz, Nicolas Daix, Emanuele Uccelli, Vladimir Djara, Daniele Caimi, Christophe Rossel, Marilyne Sousa, Heinz Siegwart, Chiara Marchiori, Jean-Michel Hartmann, Jean Fompeyrine](#)

1724 [Invited: Heterogeneously Integrated III-V on Silicon Lasers](#)

[Badhise Ben Bakir, Corrado Sciancalepore, Antoine Descos, H el ene Duprez, Damien Bordel, Loic Sanchez, Christophe Jany, Karim Hassan, Pierre Brianceau, Veronique Carron, Sylvie Menezo](#)

1725 [Effects of Miscut Substrates on Electrical Conductivity Across InP and GaAs Wafer-Bonded Structures](#)

[Jeffrey McKay, Mark Seal, K. Yeung, M. Jackson, M. S. Goorsky](#)

1726 [Type-II Band Profile of GaAs/Si Hetero Junctions by Surface Activated Bonding for Hybrid Tandem Cells](#)

[Naoteru Shigekawa, Jianbo Liang, Masashi Morimoto, Shota Nishida](#)

1727 [Chemical Mechanical Polishing of III-V Materials for Wafer Bonding Applications](#)

[Jeffrey McKay, M. S. Goorsky, Douglas Chen, Sahar Sareminaeni](#)

1728 [Invited: Water Stress Corrosion in Bonded Structures](#)

[Frank Fournel, Chlo e Martin-Cocher, Damien Radisson, Vincent Larrey, Elodie Beche, Christophe Morales, Pierre-Antoine Delean, Fran ois Rieutord, H. Moriceau](#)

1729 [Surface Characterization for and by Semiconductor Wafer Direct Bonding](#)

[Roy Knechtel, Natalie Frohn, Holger Klingner](#)

1730 [AlN-AlN Wafer Bonding and Its Thermal Characteristics](#)

[Shuyu Bao, Kwang Hong Lee, Gang Yih Chong, Eugene A Fitzgerald, Chuan Seng Tan](#)

1731 [Temporary Wafer Bonding by Polyelectrolyte Interlayers](#)

[Marko Eichler, Helena Dillmann, Leo Clemens Reim, Michael Thomas, Claus-Peter Klages](#)

1732 [Delamination Root Cause in Temporary Bonding](#)

[Karine Vial, Frank Fournel, Markus Wimplinger, Jürgen Burggraf, Julian Bravin, Pierre Montméat, Michel Pellat](#)

1733 [New Temporary Bonding Solution Based on a Vacuum Wafer Carrier](#)

[Tony Rogers, Rob Santilli](#)

1734 [Hermeticity and Reliability of Al-Al Thermocompression Wafer Bonding](#)

[Nisant Malik, Erik Poppe, Kari Schjolberg-Henriksen, Maaïke Margrete Visser Taklo, Terje G Finstad](#)

1735 [Large Area Plan-View Transmission Electron Microscopy Sample Preparation for Direct-Bonded Interfaces](#)

[Brett Beekley, C.R. Roberts, M. S. Salazar, M. S. Goorsky](#)

1736 [Hermeticity and Reliability of Au-Au Thermocompression Bonds, Realized at Low Temperature](#)

[Nisant Malik, Hannah Tofteberg, Erik Poppe, Terje G Finstad, Kari Schjolberg-Henriksen](#)

1737 [Invited: Wafer-Bonding for MEMS – Status and Trends](#)

[Ralf Hausner](#)

1738 [Invited: Wafer-Level Integration of Embedded Cooling Approaches](#)

[Stephan Paredes, Yassir Madhour, Gerd Schlottig, Chin Lee Ong, Thomas Brunswiler](#)

1739 [Low-Temperature Solid-State Bonding Using Hydrogen Radical Treated Solder for Optoelectronic and MEMS Packaging](#)

[Eiji Higurashi, Hiromu Kawai, Tadatomo Suga, Sakie Okada, Taizoh Hagihara](#)

1740 [Electrical, Mechanical, and Hermeticity Properties of Low-Temperature, Plasma Activated Direct Silicon Bonded Joints](#)

[Kari Schjøberg-Henriksen, Nishant Malik, Elin Vold Gundersen, Oscar Rincon Christiansen, Kristin Imenes, Sigurd Teodor Moe](#)

1741 [Materials Issues in Hermetic Wafer Level Packaging Using Au Thermocompression and Au-Sn Transient Liquid Phase Bonding](#)

[Dany Chagnon, Dilek Isik, Pierre Lévesque, François Lewis, Marie-Ève Caza, Xuan Tuan Le, Jean-Sébastien Poirier, Damien Michel, Ronan Larger, Oussama Moutanabbir](#)

1742 [Detailed Investigations of Inner Cavity Pressure of MEMS Devices Sealed by Wafer Bonding](#)

[Roy Knechtel, Sophia Dempwolf, Siegfried Hering](#)

1743 [Low Activation Temperature Au/Ti Getter Films for Wafer-Level Vacuum Packaging](#)

[Ming Wu, Johan Moulin, Guillaume Agnus, Alain Bosseboeuf](#)

1744 [Leak Rates and Residual Gas Pressure in Cavities Sealed by Metal Thermo-Compression Bonding and Silicon Direct Bonding](#)

[Kari Schjøberg-Henriksen, Nishant Malik, Asmund Sandvand, Gjermund Kittilsland, Sigurd Teodor Moe](#)

1745 [Invited: Direct Bonding: A Key Enabler for 3D Monolithic Integration](#)

[Laurent Brunet, Perrine Batude, Frank Fournel, Lamine Benaissa, Claire Fenouillet-Beranger, Luca Pasini, Fabien Deprat, Bernard Previtali, Fabienne Ponthenier, Aurélien Seignard, Catherine Euvrard-Colnat, Maurice Rivoire, Pascal Besson, Christian Arvet, Elodie Beche, Olivier Rozeau, Olivier Billoint, Ogun Turkyilmaz, Fabien Clermidy, Thomas Signamarcheix, Maud Vinet](#)

1746 [Three-Dimensional Integration of Fully Depleted Silicon-on-Insulator Transistor Substrates for CMOS Image Sensors Using Au/SiO₂ Hybrid Bonding and XeF₂ Etching](#)

[Kei Hagiwara, Masahide Goto, Yoshinori Iguchi, Hiroshi Ohtake, Takuya Saraya, Hiroshi Toshiyoshi, Eiji Higurashi, Toshiro Hiramoto](#)

1747 [Development of Materials Integration for Laser Gain Media: Single Crystals and Ceramic \(Polycrystalline\) Materials and Applications](#)

[Jeffrey McKay, Tingyu Bai, M. S. Goorsky](#)

1748 [Room-Temperature Wafer Direct Bonding Using Ne-Beam Surface-Activation](#)

[Hideki Takagi, Yuichi Kurashima, Atsuhiko Maeda](#)

1749 [Surface Inspection of Cu-Cu Non-Thermal Compression Bonding for Wafer-to-Wafer 3D Stacking](#)

[Doowon Kwon, Young-Uk Song, Pilkyu Kang, Taeseok Oh, Chang-Rok Moon, Duckhyung Lee](#)

1750 [Combined Surface-Activated Bonding \(SAB\) Technologies for New Approach to Low Temperature Wafer Bonding](#)

[Ran He, Masahisa Fujino, Akira Yamauchi, Tadatomo Suga](#)

1751 [Monolithic Thin Wafer Stacking Using Low Temperature Direct Bonding](#)

[Jürgen Burggraf, Julian Bravin, Harald Wiesbauer, Viorel Dragoi](#)

1752 [Novel Surface Preparation Methods for Covalent and Conductive Bonded Interfaces Fabrication](#)

[Christoph Flötgen, Nasser Razek, Viorel Dragoi, Markus Wimplinger](#)

[1753 Enhancement of Bonding Strength for Low Temperature Si₃N₄/Si₃N₄ Direct Wafer Bonding by Nitrogen-Plasma Activation and Hydrofluoric Pre-dip](#)

[F. -S. Lo, C. -C. Chiang, C. Li, T. -H. Lee](#)

[1754 Invited: Room Temperature Bonding Using Thin Metal Films \(Bonding Energy and Technical Potential\)](#)

[Takehito Shimatsu, Miyuki Uomoto, Hitoe Kon](#)

[1755 Invited: Reactive Bonding with Integrated Reactive and Nano Scale Energetic Material Systems \(iRMS\): State-of-the-Art and Future Development Trends](#)

[Joerg Braeuer, Jan Besser, Silvia Hertel, Robin Masser, Werner Schneider, Maik Wiemer, Thomas Gessner](#)

[1756 Modeling and Integration Phenomena of metal-metal direct bonding technology](#)

[Lea Di Cioccio, Floriane Baudin, Patrice Gergaud, Vincent Delaye, Pierre-Henri Jouneau, François Rieutord, Thomas Signamarcheix](#)

[1757 Voiding Phenomena in Copper-Copper Bonded Structures: Role of Creep](#)

[Paul Gondcharton, Bruno Imbert, Lamine Benaissa, Marc Verdier](#)

[1758 Formic Acid Treatment with Pt Catalyst for Cu Direct Bonding at Low Temperature](#)

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[1759 Optimization of Low Temperature Cu-Cu Wafer Bonding Using Advanced Analytical Methods](#)

[Bernhard Rebhan, Markus Wimplinger, Kurt Hingerl](#)

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[1760\(Plenary\) Extending the FETs: Challenges and Opportunities for New Materials and Structures](#)

[Ken Uchida, Tsunaki Takahashi](#)

[1761\(Plenary\) High-Performance Photonic BiCMOS – Next Generation More-than-Moore Technology for the Large Bandwidth Era](#)

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[Motofumi Suzuki](#)

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[Otto L. Muskens](#)

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[Naoto Koshizaki, Yoshie Ishikawa](#)

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[Dukhyun Choi](#)

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[Kyoko Namura, Kaoru Nakajima, Kenji Kimura, Motofumi Suzuki](#)

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[Yuanyuan Shi, Yanfeng Ji, Fei Hui, Vanessa Iglesias, Marc Porti, Montserrat Nafria, Enrique Miranda, Gennadi Bersuker, Mario Lanza](#)

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[Shintaro Otsuka, Yoshifumi Hamada, Tomohiro Shimizu, Shoso Shingubara](#)

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[Jea-Gun Park](#)

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[Min-Su Jeon, Jong-Ung Baek, Yasutaka Takemura, Jea-Gun Park](#)

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[Yoshishige Suzuki, Frederic Bonell, Youichi Shiota, Shinji Miwa, Takayuki Nozaki, Teruya Shinjo](#)

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[Yoshihiro Asai, Hisao Nakamura](#)

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[Toshimichi Shintani, Susumu Soeya, Toshiharu Saiki](#)

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Takasumi Ohyanagi, Masahito Kitamura, Mitsuharu Tai, Masaharu Kinoshita, Takahiro Morikawa, Kennichi Akita, Norikatsu Takaura

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Kiyoteru Kobayashi, Shinji Naito, Shin Tanaka, Yoshina Ito

2047Study on Oxide Thickness Dependence of Current-Voltage Characteristics for HfO_x Based ReRAM Device

Yoshifumi Hamada, Shintaro Otsuka, Tomohiro Shimizu, Shoso Shingubara

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Youngjae Kim, Yoonki Min, Jimin Lee, Hyunchul Sohn

2049Effect of Valence State of Doping Materials on Resistance Switching Characteristics of Doped HfO₂ Films

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[Luca Larcher, Onofrio Pirrotta, Francesco Maria Puglisi, Andrea Padovani, Paolo Pavan, Luca Vandelli](#)

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Q6-Photovoltaics for the 21st Century 10

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[Yeong-Her Wang, Jhong-Ciao Ke, Kan-Lin Chen, I-Tseng Tang, Kuan-Wei Lee, Liang-Wen Ji, Chien-Jung Huang](#)

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[Rodrigo Garcia, Julio Villanueva, Renán Escalante, Beatriz Heredia, Gerko Oskam](#)

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[Francisco Ivan Lizama-Tzec, Geonel Rodriguez-Gattorno, U. Pal, Gerko Oskam](#)

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[Andrew J Haring, Amanda J Morris](#)

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[Yun-Hyuk Ko, Seung-Wook Baek, Jea-Gun Park](#)

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[Humberto Julián Mandujano-Ramírez, Gerko Oskam, José Pablo Gonzalez-Vazquez, Juan Antonio Anta](#)

2067 [Evaluation of ALD-Grown Metal Oxide Tunnel Junction Layer for Organic Tandem Cells](#)

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[Wen-Cheng Sun, Xiaofei Han, Meng Tao](#)

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[Gon Namkoong, Ilho Nam, Kai Zhang, Helmut Baumgart](#)

Q7-Semiconductors, Dielectrics, and Metals for Nanoelectronics 12

Dielectric Science and Technology/Electronics and Photonics

[2084 Molecular Dynamics Simulation of Dipole Layer Formation at High-k/SiO₂ Interfaces](#)

[Takanobu Watanabe, Ryo Kuriyama, Masahiro Hashiguchi, Ryusuke Takahashi, Kosuke Shimura, Atsushi Ogura, Shinichi Satoh](#)

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[Mdnasiruddin Bhuyian, Durga Misra, Kandabara Tapily, Robert Clark, Steve Consiglio, Cory Wajda, G. Nakamura, Gert Leusink](#)

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[Samia Ahmed Suliman, Osama Osman Awadelkarim, Jifa Hao, Mark Rioux](#)

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[Michel Houssa, Emilio Scalise, Bas van den Broek, Augustin Lu, Geoffrey Pourtois, Valeri V. Afanas'ev, Andre Stesmans](#)

2102 [Graphene and 2-Dimensional Materials for Nanoelectronics Applications](#)

[Max Christian Lemme](#)

2103 [Doping, Functionalization, and Permeability of Graphene: Insights from First-Principles Studies](#)

Leonidas Tsetseris, Bin Wang, Sokrates T Pantelides

2104Electron Device Potential of 2D Crystal Semiconductors

Debdeep Jena

2105Molecule@MOF: A New Class of Electronic Materials

Albert Alec Talin, Vitalie Stavila, Michael E. Foster, Farid El Gabaly, Alexandra C. Ford, François Léonard, Mark D Allendorf

2106Electrical Characteristics of Multilayer MoS₂ Transistors at Real Operating Temperatures and Different Ambient Conditions

Hyuk-Jun Kwon, Jaewon Jang, Hongki Kang, Sunkook Kim, Vivek Subramanian, Costas P. Grigoropoulos

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Jihun Mun, Dongbin Kim, Yonghyeon Shin, Juyoung Yun, Sangwoo Kang, Taesung Kim

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Jinkyung Yoo, Shadi A Dayeh, Norman Bartelt, S Tom Picraux

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Bhadri N Varadarajan, Bo Gong

2111Investigation of Frenkel-Pair Formation in HfO₂ and Its Influence on OxRAM Memory Reliability

Elisa Vianello, Philippe Blaise, Boubacar Traoré, Kanhao Xue, Leonardo Fonseca, Gabriel Molas, Barbara de Salvo, Luca Perniola, Yoshio Nishi

2112Memory and Logic Electronics Based on Nanoscale Resistive Switches (Memristors)

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2113Resistive Switching Characteristics and Controllable Quantized Conductance in Single-Crystal Anatase TiO₂ on Si (001)

Edward T. Yu, Chengqing Hu, Martin D. McDaniel, Agham B. Posadas, Alexander A. Demkov, John G. Ekerdt

2114The Interplay between Electronic and Ionic Transport in the Resistive Switching Process of Random Access Memory Devices

Blanka Magyari-Kope, Liang Zhao, Katsumasa Kamiya, Moon Young Yang, Masaaki Niwa, Kenji Shiraishi, Yoshio Nishi

2115Ferroelectric Hafnium Oxide Based Materials and Devices: Assessment of Current Status and Future Prospects

Johannes Müller, Patrick Polakowski, Stefan Müller, Thomas Mikolajick

2116Stress-Induced Asymmetric Switching and Filament Instability in Electrochemical Memories

Daniele Ielmini, Stefano Ambrogio, Simone Balatti

2117The Study of Charge Trapping in Mahas Memory Structure with Various HfO₂ Trap Layer Thicknesses

Heedo Na, Jinho Oh, Kyumin Lee, Hyunchul Sohn

2118Fabrication and Physical Properties of Thin Films TiN_x for Infrared Absorption

Bo Jiang, Tao Dong, Yong He, Zhaochu Yang, Yan Su, Kaiying Wang

[2119 Comparison of O₂ Plasma Treatment on Porous Low Dielectric Constant Material in Sidewall and Bottom of Trench Structure](#)

[Yi-Lung Cheng, Bing-Hong Lin, Wei-Syuan Haung](#)

[2120 Fabrication and Characteristic of Wrinkled Stiff Thin Films on Elastomeric Substrates by Surface Treatments](#)

[Sang Chul Lim, Jae Bon Koo, Chan Woo Park, Ji Young Oh, Soon-Won Jung, Bock Soon Na, Sang Seok Lee, Hye Yong Chu](#)

[2121 Characteristics of Inkjet-Printed Separators in Graphene-Based Supercapacitors](#)

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[2122 SURMOFs as Ultra-low k Dielectric Thin Films](#)

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Q8-Solid-state Electronics and Photonics in Biology and Medicine

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[2123 Invited: Dual-Faced Nano-Mushrooms for Multi-Functional Cell Diagnosis](#)

[Hsin-Yi Hsieh, Fan-Gang Tseng](#)

[2124 Invited: Finite Element Model Simulations to Assist the Design of Microdevices Dedicated to the Localized Electroporation of Mouse Embryos](#)

[Xuan Zhao, Elsa Mazari, Diana Suárez-Boomgaard, Isabelle Migeotte, Aitana Perea-Gomez, Charlie Gosse](#)

[2125 Invited: Detection of the Secretome and Transfection of a Single Cell Using a Nanopore](#)

[Volker Kurz, Edward Nelson, Tetsuya Tanaka, Gregory Timp](#)

[2126 Plasmonically Targeted Laser Treatment of Human Endothelial Cells](#)

[Otto L. Muskens](#)

2127 [Invited: Nanowire Field-Effect Transistor-Based Biosensors as a Tool for Life Science](#)

[Yit-Tsong Chen](#)

2128 [Invited: Metal-Semiconductor-Metal Photocurrent Chip for Hydrogen Peroxide and Biomolecular Sensing with Chemiluminescence](#)

[Fu-Hsiang Ko, Ching-Chang Lin, Da-Shiuan Sun, Tung-Ming Pan](#)

2129 [A Novel Ultra-Low Detection Limit Hydrogen Peroxide Sensor Based on Horseradish Peroxidase Immobilized Polyaniline Film](#)

[Kuan Chung Fang, Chia Ho Chu, Chen-Pin Hsu, Yen-Wen Kang, Jung-Ying Fang, Chia-Hsien Hsu, Yu-Fen Huang, Chih-Chen Chen, Sheng-Shian Li, J. Andrew Yeh, Da-Jeng Yao, Yu-Lin Wang](#)

2130 [Measurement and Modeling of the M13 Bacteriophages Transport in the Conical-Shaped Nanopore](#)

[Che-Yen Lee, Yi-Hsin Hsiao, Ji-Cheng Yu, Chih-Wei Hsu, Chia-Hsien Hsu, Chihchen Chen](#)

2131 [Capacitive Current Induced by dsDNA for Biosensor Applications](#)

[Chen-Pin Hsu, Yu-Fen Huang, Yu-Lin Wang](#)

2132 [Investigation of the Hydroxyl Radical Sensor with Conductance Change of Polyaniline](#)

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2133 [Novel Cholesterol Sensor Based on Ultra-Low Detection Limit Hydrogen Peroxide Sensor](#)

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2134 [Fabrication of Low Cost Conducting Papers for Miniaturized Electronic Biomedical Sensors](#)

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2137 [Crafting Semiconductor Organic-inorganic Nanocomposites Via Placing Conjugated Polymers in Intimate Contact with Nanocrystals for Hybrid Solar Cells](#)

[Zhiquan Lin, Jaehan Jung, Youngjun Yoon, Xinchang Pang](#)

2138 [Recent Advances in Semiconductor Nanowire Heterostructures](#)

[Howard E Jackson, Leigh M. Smith, Chennupati Jagadish](#)

2139 [Integration of Photodefinable Polybenzoxazole as Intermetal Dielectric for GaAs HBT Technology](#)

[Jiro Yota, Benny Do](#)

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2144[InAs/InP Quantum Dash Nanostructure Based Broadband Emitters: A Step Towards Energy Efficient Optical Communication](#)

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2145[Topological Insulator Bi₂Se₃ Nanowire Field Effect Transistors](#)

[Hao Zhu, Erhai Zhao, Curt A. Richter, Qiliang Li](#)

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[2148High-Performance Sb-Based III-V Nanowires Synthesized on Amorphous Substrates: From the Formation Mechanism to p-Channel Transistor Applications](#)

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[2149Room-Temperature Defect-Enabled Spin Functionality in GaAs-Based Compound Semiconductors](#)

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[2150A Quick and a Flexible Hydride Vapor Phase Epitaxy Process to Achieve Buried Heterostructure Quantum Cascade Lasers](#)

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[Xiao Dong Hu, Jie Jun Wu, Ding Li, Lei Li, Qingbin Ji, Hua Zong, Tong Han, Yahong Xie](#)

[2152III-V Nanowire MOSFETs in RF-Applications](#)

[Lars-Erik Wernersson](#)

[2153Surface Roughness Influences on the ZnO Reram](#)

[Jr-Jian Ke, Kyoko Namura, Tzu-Chiao Wei, Jr-Hau He, Motofumi Suzuki](#)

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[2154Lattice Strain Control Luminescence of Phosphors for LEDs](#)

[Ru-Shi Liu](#)

[2155 Single-Component White Emitting Silicate Glass Triply Activated by Ce³⁺/Tb³⁺/Mn²⁺ for Organic-Resin-Free White LEDs](#)

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[2156 Microreactor System with in-Situ pH Monitor for Synthesizing YVO₄: Bi, Eu Nanophosphor](#)

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