

# SYMPOSIUM G

## Spatially Resolved Characterization of Local Phenomena in Materials and Nanostructures

December 2 – 6, 2002

### Chairs

Dawn A. Bonnell Univ of Pennsylvania  
Javier Piqueras Univ Complutense of Madrid  
Fredy R. Zypman Yeshiva Univ  
Andrew P. Shreve Los Alamos National Laboratory

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\* Invited paper

♣ Also in conjunction with Symposium NN

### SESSION G1: ATOMIC SCALE CHARACTERIZATION WITH ELECTRON OPTICS

Chair: Xiaoqing Q. Pan  
Monday Morning, December 2, 2002  
Room 200 (Hynes)

#### 8:30 AM \*G1.1

NANOSCALE STRUCTURE/PROPERTY CORRELATION THROUGH ABERRATION-CORRECTED STEM AND THEORY. S.J. Pennycook, A.R. Lupini, Solid State Division, Oak Ridge National Laboratory, Oak Ridge, TN; P.D. Nellist, O.L. Krivanek, N. Dellby, Nion Co., Kirkland, WA; J.R. McBride, S.J. Rosenthal, Department of Chemistry, Vanderbilt University, Nashville, TN; G. Duscher, Department of Materials Science and Engineering, North Carolina State University, Raleigh, NC; M. Glasov, Alcoa Technical Center, Pittsburgh, PA; K. Sohlberg, Department of Chemistry, Drexel University, Philadelphia, PA; S. Rashkeev, and S.T. Pantelides, Department of Physics and Astronomy, Vanderbilt University, Nashville, TN.

#### 9:00 AM G1.2

NANOSCALE 3D CHEMICAL MAPPING BY SPECTROSCOPIC ELECTRON TOMOGRAPHY. Günter Möbus, Ron Doole, Beverley Inkson, Dept of Materials, Oxford University, UNITED KINGDOM.

#### 9:15 AM G1.3

ATOMIC RESOLUTION OF LITHIUM IONS IN LiCoO<sub>2</sub>. Y. Shao-Horn, Institut de Chimie de la Matière Condensée de Bordeaux-CNRS and Ecole Nationale Supérieure de Chimie et Physique de Bordeaux, Université Bordeaux I, Pessac, FRANCE; M.A. O'Keefe, E.C. Nelson, National Center for Electron Microscopy, Lawrence Berkeley National Laboratory, Berkeley, CA; L. Croguennec, C. Delmas, Institut de Chimie de la Matière Condensée de Bordeaux-CNRS and Ecole Nationale Supérieure de Chimie et Physique de Bordeaux, Université Bordeaux I, Pessac, FRANCE.

#### 9:30 AM G1.4

FLUCTUATION MICROSCOPY STUDIES OF ALUMINUM OXIDES EXPOSED TO Cl IONS. Xidong Chen, Cedarville Univ & Argonne National Lab, Cedarville, OH; John Sullivan, Charles Barbour, Craig Johnson, Sandia National Lab, Albuquerque, NM; Guangwen Zhou, Judith Yang, Univ of Pittsburgh, Pittsburgh, PA.

#### 9:45 AM G1.5

A LOOF TRANSMISSION EELS, AND ITS APPLICATION TO NANOSTRUCTURES FOR ELECTROMAGNETIC NANOMEASUREMENTS. Bryan W. Reed and Mehmet Sarikaya, Materials Science and Engineering, University of Washington, Seattle, WA.

10:00 AM BREAK

#### 10:30 AM G1.6

ANALYSIS OF NANOMETER-SCALE CHEMICAL AND STRUCTURAL INHOMOGENEITY BY TRANSMISSION ELECTRON MICROSCOPY. R.M. Stroud, Naval Research Laboratory, Washington, DC.

#### 10:45 AM G1.7

HIGH RESOLUTION EELS WITH A NEW MONOCHROMIZED TEM APPLIED TO NANOSCALE STRUCTURE STUDIES. Gerald Kothleitner, Christof Mitterbauer, Ferdinand Hofer, Graz University of Technology, Research Institute for Electron Microscopy, Graz, AUSTRIA; Henny Zandbergen, Delft University of Technology, Delft, THE NETHERLANDS; Peter Tiemeijer, Bert Freitag, FEI Electron Optics, Eindhoven, THE NETHERLANDS.

#### 11:00 AM G1.8

QUANTIFICATION OF DISPLACEMENT FIELDS FROM LATTICE IMAGES (HREM) AND ELECTRON EXIT WAVES IN NANOSTRUCTURED COMPOSITE OXIDES. H.A. Calderon, A. Huerta, Dept. Ciencia de Materiales, ESFM-IPN, Mexico D.F., MEXICO; C. Kisielowski, R. Kilaas, NCEM-LBNL, Berkeley CA.

#### 11:15 AM G1.9

ELECTRONIC STRUCTURE, OPTICAL PROPERTIES, LONDON DISPERSION FORCES AND FULL SPECTRAL HAMAKER COEFFICIENTS FOR NANOSTRUCTURED INTERFACES IN STRONTIUM TITANATE. Roger H. French, DuPont Co., Central Research, Experimental Station, Wilmington, DE; Lin K. Denoyer, Deconvolution and Entropy Consulting, Ithaca, NY; Klaus van Benthem, Wilfred Sigle, Max-Planck-Institut für Metallforschung, Stuttgart, GERMANY; V. Adrian Parsegian, Rudolf Podgornik, National Institute of Health, Laboratory of Physical and Structural Biology, Section on Molecular Biophysics, Bethesda, MD.

#### 11:30 AM G1.10

ELECTRONIC STRUCTURE OF GRAIN BOUNDARIES IN NITROGEN-DOPED ULTRANANOCRYSTALLINE DIAMOND. James Birrell, University of Illinois at Urbana Champaign, Dept of Materials Science and Engineering, Urbana, IL; O. Auciello, J.E. Gerbi, J.M. Gibson, J.A. Carlisle, Argonne National Laboratory, Materials Science Division, Argonne, IL.

#### 11:45 AM G1.11

ATOMIC-SCALE IMAGING AND SPECTROSCOPY OF DOPANT ATOMS INSIDE CRYSTALLINE MATERIALS. David Muller, Paul M. Voyles, Akira Ohtomo, Harold Y. Hwang, John L. Grazul, Paul H. Citrin, Bell Labs, Lucent Technologies, Murray Hill, NJ; Hans J. Gossmann, Agere Systems, Murray Hill, NJ.

### SESSION G2: OPTICALLY BASED PROBES: LUMINESCENCE AND RAMAN

Chair: Javier Piqueras  
Monday Afternoon, December 2, 2002  
Room 200 (Hynes)

#### 1:30 PM \*G2.1

SPATIALLY RESOLVED LUMINESCENCE IN SEMICONDUCTORS. Sergei Ostapenko, University of South Florida, Center for Microelectronics Research, Tampa, FL.

#### 2:00 PM \*G2.2

NEAR-FIELD CATHODOLUMINESCENCE: CHARACTERIZATION OF OPTOELECTRONIC PROPERTIES AT NANOMETER SCALE. L.J. Balk, R. Heiderhoff, Department of Electronics, University of Wuppertal, Wuppertal, GERMANY.

#### 2:30 PM G2.3

CATHODOLUMINESCENCE IN THE TRANSMISSION ELECTRON MICROSCOPE. Martin Albrecht, T. Remmele, G. Frank, H.P. Strunk, Universität Erlangen Nürnberg, Institut für Werkstoffwissenschaften, Lehrstuhl Mikrocharakterisierung, Erlangen, GERMANY; K. Brand, H. Lichte, Technische Universität Dresden, Dresden, GERMANY; T. Walter, Landeszentrum für Hochleistungs Elektronenmikroskopie, Institut für Anorganische Chemie, Universität Bonn, GERMANY.

#### 2:45 PM G2.4

EFFECT OF THERMAL AND MECHANICAL TREATMENTS ON THE CATHODOLUMINESCENCE OF TIN AND TITANIUM OXIDES. D. Maestre, R. Plugaru, A. Cremades and J. Piqueras, Departamento de Física de Materiales, Facultad de Ciencias Físicas, Universidad Complutense, Madrid, SPAIN.

3:00 PM BREAK

**3:30 PM \*G2.5**

RAMAN IMAGING OF LOCAL STRUCTURE IN SEMICONDUCTOR DEVICES. Patrick J. Treado, David D. Tuschel, ChemIcon Inc., Pittsburgh, PA.

**4:00 PM G2.6**

IMAGING AND SPECTROSCOPY OF GaN FILMS BY TWO-PHOTON EXCITATION. J.W.P. Hsu, F.F. Schrey, and H.M. Ng, Bell Labs, Lucent Technologies, Murray Hill, NJ.

**4:15 PM G2.7**

STUDY OF DOPING IN GaAs LAYERS BY LOCAL PROBE TECHNIQUES: MICRO-RAMAN, MICRO-PHOTOLUMINESCENCE AND CATHODOLUMINESCENCE. Angel Miguel Ardila, Departamento de Física, Facultad de Ciencias, Universidad Nacional de Colombia, Santa Fe de Bogotá, COLOMBIA and Departamento de Física de la Materia Condensada, Facultad de Ciencias, Universidad de Valladolid, Valladolid, SPAIN; Oscar Martínez, Manuel Avella, Luis Felipe Sanz, Juan Jiménez, Departamento de Física de la Materia Condensada, Facultad de Ciencias, Universidad de Valladolid, Valladolid, SPAIN; Bruno Gérard, THALES, Corporate Research Laboratory, Orsay, FRANCE; Jerome Napierala, Evelyne Gil-Lafon, LASMEA UMR CNRS, Université Blaise Pascal, Les Cézeaux, Aubière, FRANCE.

**4:30 PM G2.8**

MICRO-CHARACTERIZATION OF HIGH-QUALITY THICK ZnO CVD LAYERS. Axel Hoffmann, Ute Haboek, Martin Strassburg, Inst of Solid State Physics, Technical Univ Berlin, Berlin, GERMANY; Till Riemann, Frank Bertram, J. Christen, Inst of Experimental Physics, Otto-von-Guericke-Univ Magdeburg, Magdeburg, GERMANY; Arndt Zeuner, Detlev Hofmann, Bruno K. Meyer, I. Physikalisches Inst, Justus-Liebig-Univ Giessen, Giessen, GERMANY.

**4:45 PM G2.9**

TEM-CATHODOLUMINESCENCE STUDIES OF QUANTUM STRUCTURES IN SEMICONDUCTOR EPITAXIAL LAYERS. Naoki Yamamoto, Daigo Horiuchi, Hirotugu Itoh, Vincenzo Grillo, Tokyo Inst. of Tech., Dept. of Physics, Tokyo, JAPAN.

SESSION G3: TUNNELING BASED PROBES OF SEMICONDUCTORS

Chair: Fredy R. Zypman  
Tuesday Morning, December 3, 2002  
Room 200 (Hynes)

**8:30 AM \*G3.1**

HIGH SPATIAL RESOLUTION ULTRAFAST SCANNING TUNNELING MICROSCOPY. Antoinette J. Taylor and Dzmitry A. Yarotski, Condensed Matter and Thermal Physics Group, Los Alamos National Laboratory, Los Alamos, NM.

**9:00 AM G3.2**

PROBING LOCALIZED AND PROPAGATING SURFACE PLASMONS BY STM-INDUCED ELECTROLUMINESCENCE. S. Egusa, Y.-H. Liau, and N.F. Scherer, Dept. of Physics, Dept of Chemistry, The James Franck Institute, and MRSEC, The University of Chicago, Chicago, IL.

**9:15 AM G3.3**

SCANNING TUNNELING OPTICAL RESONANCE MICROSCOPY (STORM). Ryne P. Raffaele and Thomas Gennett, NanoPower Research Laboratories, Rochester Institute of Technology, Rochester, NY; Janice E. Lau, Phillip Jenkins, and Stephanie L. Castro, Ohio Aerospace Institute, Brookpark, OH; Padetha Tin, National Center for Microgravity Research, Case Western University, Cleveland, OH; David M. Wilt, Anna M. Pal, and Sheila G. Bailey, NASA Glenn Research Center, Cleveland, OH.

**9:30 AM \*G3.4**

PROBING POTENTIAL DISTRIBUTIONS IN SEMICONDUCTORS WITH THE SCANNING TUNNELING MICROSCOPE. R.M. Feenstra, Y. Dong, Dept. Physics, Carnegie Mellon University, Pittsburgh, PA; R. Hey, G. Meyer, K.H. Ploog, Paul-Drude-Institut für Festkörperelektronik, Berlin, GERMANY; M.P. Semtsiv, W.T. Masselink, Dept. of Physics, Humboldt-Universite zu Berlin, Berlin, GERMANY; F. Moresco, K.H. Rieder, Institut für Experimentalphysik, Freie Universite Berlin, Berlin, GERMANY.

**10:00 AM BREAK**

SESSION G4: NEW PROBES OF NANOSCALE PROPERTIES

Chair: Fredy R. Zypman  
Tuesday Morning, December 3, 2002  
Room 200 (Hynes)

**10:30 AM \*G4.1**

MEASURING AND CONTROLLING NANOMETER-SCALE PROPERTIES IN MOLECULES AND ASSEMBLIES. P.S. Weiss, The Pennsylvania State University, Department of Chemistry, University Park, PA. ♣

**11:00 AM G4.2**

TOWARD NANOSCALE NUCLEAR MAGNETIC RESONANCE BY FORCE MICROSCOPY. Sean R. Garner, Department of Physics, Cornell University; Neil E. Jenkins, Lauren P. DeFlores, Tse Nga Ng, Seppe Kuehn, Jahan M. Dawlaty, James G. Kempf, and John A. Marohn, Department of Chemistry and Chemical Biology, Cornell University, Ithaca, NY.

**11:15 AM G4.3**

REPRODUCIBILITY OF NANO- AND MICRO-SCALE MULTI-POINT PROBE SHEET RESISTANCE MEASUREMENTS. Christian L. Petersen, Capres A/S, Vancouver, BC, CANADA; Daniel Worledge, IBM T.J. Watson Research Center, Yorktown Heights, NY; Peter R.E. Petersen, Capres A/S, Lyngby, DENMARK.

**11:30 AM G4.4**

NANOIMPEDANCE SPECTROSCOPY. Rui Shao, Sergei V. Kalinin, and Dawn A. Bonnell, Dept. of Materials Science and Engineering, Univ. of Pennsylvania, Philadelphia, PA.

**11:45 AM G4.5**

DEVELOPMENT OF CANTILEVER BASED LORENTZ FORCE MICROSCOPY. Yutaka Majima, Jun Ichihara, Atsushi Okuda, Tokyo Institute of Technology, Dept. of Physical Electronics, Tokyo, JAPAN.

SESSION G5: SCANNING PROBE APPLICATIONS OF MICROSCOPIES

Chair: Sergei V. Kalinin  
Tuesday Afternoon, December 3, 2002  
Room 200 (Hynes)

**1:30 PM G5.1**

CHARACTERISATION OF NANOCRYSTALS BY KELVIN PROBE FORCE MICROSCOPY AND SCANNING CAPACITANCE FORCE MICROSCOPY. Grazia Tallarida, Sabina Spiga, Marco Fanciulli, Laboratorio MDM-INFM, Agrate Brianza, Milan, ITALY.

**1:45 PM G5.2**

EXPERIMENTS AND SIMULATION OF NEAR FIELD SCANNING OPTICAL MICROSCOPY OF FERROELECTRIC DOMAIN WALLS. S. Kim, V. Gopalan, Materials Research Laboratory, Pennsylvania State University, University Park, PA.

**2:00 PM G5.3**

BROADBAND NEAR-FIELD MICROWAVE MICROSCOPY OF Ba<sub>x</sub>ST<sub>1-x</sub>O<sub>3</sub> THIN FILMS. A. Tselev, S.M. Anlage, and R. Ramesh, MRSEC and Center for Superconductivity Research, Physics Department, University of Maryland, College Park, MD.

**2:15 PM G5.4**

KELVIN PROBE MICROSCOPY AND CATHODOLUMINESCENCE MICROANALYSIS OF THE IRRADIATION INDUCED MODIFICATION OF INSULATING MATERIALS. Marion A. Stevens-Kalceff, School of Physics, University of New South Wales, Sydney, NSW, AUSTRALIA.

**2:30 PM G5.5**

CHARACTERIZATION OF HIGH-k DIELECTRIC FILMS WITH TUNNELING AFM. Xiang-Dong Wang, Joe Kulik, N.V. Edwards, Shifeng Lu, Motorola, DigitalDNA Laboratories, Mesa, AZ; S.B. Samavedam, Motorola, DigitalDNA Laboratories, Austin, TX.

**2:45 PM G5.6**

SPATIAL VARIATION IN CURRENT DENSITY OBSERVED USING MAGNETIC FORCE MICROSCOPY. Ruchirej Yongsunthon, Andrei Stanishevsky, and Ellen D. Williams, University of Maryland, College Park, MD; P.J. Rous, University of Maryland, Baltimore County, MD.

**3:00 PM BREAK**

SESSION G6: SCANNING PROBE BASED  
MECHANICAL PROPERTY MEASUREMENTS

Chair: Sergei V. Kalinin  
Tuesday Afternoon, December 3, 2002  
Room 200 (Hynes)

**3:30 PM \*G6.1**

TOWARD MEASURING SINGLE MOLECULE ELECTRO-DYNAMIC FIELDS. Steven Eppell, Brian Todd, Case Western Reserve Univ, Dept of Biomedical Engineering, Cleveland, OH; Fredy Zypman, Yeshiva Univ, Dept of Physics, New York, NY.

**4:00 PM G6.2**

NANOINDENTATION: TOWARDS THE SENSING OF ATOMIC BOND ENERGIES. Sergi Garcia-Manyes, Pau Gorostiza, Fausto Sanz, Bioelectronics & Nanobioscience Research Center, University of Barcelona, SPAIN; J. Fraxedas, Material Science Research Institute of Barcelona, CSIC, Bellaterra, SPAIN.

**4:15 PM G6.3**

QUANTITATIVE EVALUATION OF ELASTOMER BLENDS BY ATOMIC FORCE MICROSCOPY. David Weston, Rich Czerw, David L. Carroll, Clemson University, Dept of Materials Science and Engineering, Clemson, SC.

**4:30 PM G6.4**

ACOUSTIC MEASUREMENTS FOR NANOMECHANICAL TEST INSTRUMENTS. Antanas Daugela, Oden L. Warren, Thomas J. Wyrobek, Hysitron Inc, Minneapolis, MN.

**4:45 PM G6.5**

IN-PLANE MATERIAL ANISOTROPY REVEALED BY INTERMITTENT CONTACT ATOMIC FORCE MICROSCOPY. Matthew S. Marcus, Univ of Wisconsin-Madison, Dept of Physics, Madison, WI; Robert W. Carpick, Univ of Wisconsin-Madison, Dept of Engineering Physics, Materials Science Program, and Rheology Research Center, Madison, WI; Darryl Y. Sasaki, Sandia National Laboratories, Biomolecular Materials and Interface Science, Albuquerque, NM; M.A. Eriksson, Univ of Wisconsin-Madison, Dept of Physics, Madison, WI.

SESSION G7: POSTER SESSION  
NANOSCALE PHENOMENA IN MATERIALS AND  
DEVICES

Tuesday Evening, December 3, 2002  
8:00 PM

Exhibition Hall D (Hynes)

**G7.1**

Abstract Withdrawn

**G7.2**

CHARACTERIZATION OF Au-Cu BINARY ALLOY NANOPARTICLES. G. Malyavanatham, D.T. O'Brien, W.T. Nichols, M.F. Becker D. Kovar, and J.W. Keto, Texas Materials Institute, University of Texas at Austin, Austin, TX.

**G7.3**

IMPROVED RESOLUTION IN MFM IMAGING WITH NANOTUBE MODIFIED TIPS. Amol Patil, Department of Materials Science and Engineering; Andrew G. Rinzler, Department of Physics, University of Florida, Gainesville, FL.

**G7.4**

DEPTH RESOLVED IMAGING OF YELLOW LUMINESCENCE IN LATERAL EPITAXIAL OVERGROWN GaN USING IONOLUMINESCENCE. E.J. Teo, A.A. Bettiol, Research Centre for Nuclear Microscopy, Dept of Physics, National University of Singapore; Y.Y. Liu, C.H. Phang, Centre for Integrated Circuit Failure Analysis and Reliability, Dept of Electrical and Electronic Engineering, National University of Singapore, SINGAPORE; Zhang Ji, Centre for Optoelectronics, National University of Singapore, SINGAPORE; M.S. Hao, Institute of Materials Research and Engineering.

**G7.5**

CHEMICAL FUNCTIONALIZATION OF ATOMIC FORCE MICROSCOPE TIPS FOR INCREASING UTILITY OF "ADHESION CONTRAST" AFM AS A SURFACE CHARACTERIZATION TOOL. Alan K. Wertsching, Liem Nguyen, Tammy L. Trowbridge, Tedd E. Lister, Patrick J. Pinhero, Materials Department, Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID.

**G7.6**

STM-REBIC STUDY OF NANOCRYSTALLINE AND CRYSTALLINE SILICON. E. Nogales, B. Méndez, J. Piqueras, R. Plugaru, Dept. Física de Materiales, Facultad de Ciencias Físicas, Univ. Complutense de Madrid, Madrid, SPAIN.

**G7.7**

EXTRACTING IMPURITY POSITION IN NANO-WIRES FROM SCANNING TUNNELING MICROSCOPY. Jeremy Stein, Fredy R. Zypman, Yeshiva University, Department of Physics, New York, NY.

**G7.8**

MICROSTRUCTURAL ANALYSIS OF RUTILE TiO<sub>2</sub>-Sn NANOCRYSTALS. Xiang-Cheng Sun, D.E. Nikles, Center for Materials for Information Technology, The University of Alabama, Tuscaloosa, AL; F. Pedraza, Instituto Mexicano del Petroleo, D.F. MEXICO.

**G7.9**

CHARACTERIZATION OF STRAIN AND COMPOSITION IN COHERENT ISLANDS USING TRANSMISSION ELECTRON MICROSCOPY. Chuan-Pu Liu, Department of Materials Science and Engineering, National Cheng-Kung University, Tainan, TAIWAN.

**G7.10**

CORRELATION LENGTH AND MEASURING MEDIUM RANGE ORDER IN AMORPHOUS MATERIALS. P. Keblinski, R.K. Dash, Materials Science and Engineering Department, Rensselaer Polytechnic Institute, Troy, NY; P. Voyles, Bell Laboratories, Murray Hill, NJ; M. Gibson, Advanced Photon Source, Argonne National Laboratory, Argonne, IL; and M.M. Treacy, NECI, Princeton, NJ.

**G7.11**

TEM OF NOVEL TRANSROTATIONAL SOLID STATE ORDER FORMED AS A RESULT OF AMORPHOUS-CRYSTALLINE TRANSITION IN THIN FILMS. Vladimir Yu. Kolosov, Engineering Dept., Ural State Economic University, Ekaterinburg, RUSSIA.

**G7.12**

DEFORMATION-ASSISTED NANOCRYSTALLIZATION IN A METALLIC GLASS STUDIED BY NANOINDENTATION AND TRANSMISSION ELECTRON MICROSCOPY. W.H. Jiang, Department of Nuclear Engineering and Radiological Sciences, and M. Atzmon, Department of Nuclear Engineering and Radiological Sciences & Department of Materials Sciences and Engineering, University of Michigan, Ann Arbor, MI.

**G7.13**

HIGH-RESOLUTION MICROSCOPIC CHARACTERIZATION OF SHEAR BANDS FORMED IN Al-RICH METALLIC GLASS BY COMPRESSION AND TENSION. W.H. Jiang, Department of Nuclear Engineering and Radiological Sciences, and M. Atzmon, Department of Nuclear Engineering and Radiological Sciences & Department of Materials Sciences and Engineering, University of Michigan, Ann Arbor, MI.

**G7.14**

FIB-TEM CHARACTERIZATION OF LOCALLY RESTRICTED IMPLANTATION DAMAGE. Heinz D. Wanzenboeck, Stefan Harasek, Helmut Langfischer, Emmerich Bertagnolli, Vienna University of Technology, Institute for Solid State Physics, Vienna, AUSTRIA; Ulf Grabner, Gerold Hammer, Peter Pongratz, Vienna University of Technology, Institute for Solid State Physics, Vienna, AUSTRIA.

**G7.15**

ANALYTICAL AND HIGH-RESOLUTION TEM CHARACTERIZATIONS FOR NANOSCALE FRACTURED INTERFACES IN 256MBIT DRAM DEVICES. Wei (Wayne) Zhao, Infineon Technologies Richmond, Department of Technology Transfer, Sandston, VA.

**G7.16**

CATHODOLUMINESCENCE STUDY OF RARE-EARTH DOPED GaSb. Pedro Hidalgo, Bianchi Méndez, Javier Piqueras, Universidad Complutense, Dept Física de Materiales, Madrid, SPAIN; José L. Plaza and Ernesto Dieguez, Universidad Autónoma, Dept Física de Materiales, Madrid, SPAIN.

**G7.17**

CATHODOLUMINESCENCE AND MICRO-RAMAN STUDY OF GaN ELO STRUCTURES. O. Martinez, M. Avella, J. Jimenez, Dpto. Física de la Materia Condensada, E.T.S.I.I., Valladolid, SPAIN; B. Gerard, THALES Research and Technology, Domaine de Corbeville, Orsay, FRANCE; S. Galloway, Gatan UK, Oxford, UNITED KINGDOM.

**G7.18**

Abstract Withdrawn

**G7.19**

Abstract Withdrawn

**G7.20**

LOCATION OF CURRENT CARRYING FAULTS IN INTEGRATED CIRCUITS BY MAGNETIC FORCE MICROSCOPY. Anle Pu, A. Rahman, D.J. Thomson, G.E. Bridges, University of Manitoba, Dept of Electrical and Computer Engineering, Winnipeg, Manitoba, CANADA.

**G7.21**

A SCANNING TUNNELING MICROSCOPY AND POTENTIOMETRY STUDY OF EPITAXIAL AND POLYCRYSTALLINE THIN FILMS OF  $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$ . Mandar Paranjape, K. Shantha Shankar, A.K. Raychaudhuri, Dept of Physics, Indian Institute of Science, Bangalore, INDIA; N.D. Mathur, M.G. Blamire, Department of Materials Science and Engineering, Cambridge University, Cambridge, UNITED KINGDOM.

**G7.22**

APPLICATION OF STEREOLOGY TO THE STATISTICAL DESCRIPTION OF THE SPATIAL DISTRIBUTION OF SCALAR PROPERTIES IN THREE DIMENSIONAL STRUCTURES. R.T. DeHoff, University of Florida, Dept of Materials Science and Engineering, Gainesville, FL.

**G7.23**

STM-LIGHT EMISSION FROM Si(111) AND GaAs(110) SEMICONDUCTOR SURFACES. Masanori Hoshino, Tsuyoshi Takeuchi, Shigeru Kagami, Naoki Yamamoto, Tokyo Inst. of Tech., Dept. of Materials Science and Engineering, Tokyo, JAPAN.

**G7.24**

CHARACTERIZATION OF ZnO FILMS BY SCANNING TUNNELING SPECTROSCOPY AND BEAM-INDUCED CURRENT IN THE SCANNING TUNNELING MICROSCOPE. A. Urbieta, P. Fernandez, J. Piqueras, Departamento de Fisica de Materiales, Facultad de Ciencias Fisicas, Universidad Complutense de Madrid, Madrid, SPAIN; E. Vasco, C. Zaldo, Instituto de Ciencia de Materiales de Madrid, CSIC, Cantoblanco, Madrid, SPAIN.

**G7.25**

DISLOCATION-MEDIATED MECHANISMS OF MASS TRANSPORT AROUND NANOINDENTATIONS IN FCC METALS. O. Rodriguez de la Fuente, E. Carrasco, M.A. Gonzalez, J.M. Rojo, Universidad Complutense, Departamento Fisica de Materiales, Madrid, SPAIN.

**G7.26**

DETERMINATION OF THE PLASTIC BEHAVIOR OF LOW THERMAL EXPANSION GLASS AT THE NANOMETER SCALE. Richard Tejada, Roxann Engelstad, and Edward Lovell, University of Wisconsin, Computational Mechanics Center, Madison, WI; Anthony Anderson and Dehua Yang, Hysitron, Inc., Minneapolis, MN; Kenneth Blaedel, Lawrence Livermore National Laboratory, Livermore, CA.

**G7.27**

NANO-SCALE DUCTILITY OF GLASS AS EVIDENCED BY ATOMIC FORCE MICROSCOPY EXPERIMENTS. Fabrice Célarié, Daniel Bonamy, Lorenzo Ferrero, Christian Marlière, Laboratoire des Verres, UMR CNRS 5587, University Montpellier 2, FRANCE; Silke Prades, Elisabeth Bouchaud, Claude Guillot, Service de Physique et Chimie des Surfaces et Interfaces, CEA Saclay, FRANCE.

**G7.28**

VARIABLE-TEMPERATURE ELECTRIC FORCE MICROSCOPY OF ORGANIC THIN FILM DEVICES. Erik M. Muller, William R. Silveira, Neil Jenkins, Jenna Harang, John A. Marohn, Cornell University, Department of Chemistry and Chemical Biology, Ithaca, NY.

**G7.29**

NANOSCALE MEASUREMENTS AND MODELING OF PIEZOELECTRIC-FORCE MICROSCOPY OF DOMAIN WALL WIDTHS IN FERROELECTRICS. David A. Scrymgeour and Venkatraman Gopalan, Pennsylvania State University, Materials Research Laboratory, University Park, PA; Alexei Gruverman, North Carolina State University, Raleigh, NC.

**G7.30**

LOCALIZED CROSS-SECTIONING OF CARBON NANOTUBE-TO-METAL JUNCTIONS FOR HIGH SPATIAL RESOLUTION CHEMICAL AND STRUCTURAL ANALYSIS.

K. Dovidenko, J. Rullan, University at Albany-SUNY, School of NanoSciences and NanoEngineering, UAlbany Institute for Materials, Albany, NY; N.L. Abramson, Union College, Schenectady, NY. ♣

**G7.31**

ELECTRONIC AND OPTICAL CHARACTERISTICS OF PPV NANOTUBES. J.H. Park, Y.W. Park, Seoul National Univ, Nano Transport Lab, Seoul, KOREA; K. Kim, J.I. Jin, Cntr Electro-Photo-Responsive Molecules, Korea Univ, KOREA; S. Webster, J. Liu, R. Czerw, D.L. Carroll, Dept. of Mat. Eng. and Science, Clemson Univ, Clemson, SC.

**G7.32**

A COMPARISON OF SCANNING IMPEDANCE AND SCANNING GATE MICROSCOPES FOR DETERMINING PROPERTIES OF INDIVIDUAL DEFECTS IN MOLECULAR CIRCUITS. Sergei V. Kalinin and Dawn A. Bonnell, Dept. of Materials Science and Engineering, Univ. of Pennsylvania, Philadelphia, PA; Marcus Freitag and A.T. Johnson, Dept. of Physics and Astronomy, Univ. of Pennsylvania, Philadelphia, PA. ♣

**G7.33**

ORGANIC MOLECULES ACTING AS NANOMOLDS ON Cu(110). Federico Rosei, Y. Naitoh, M. Schunack, E. Legsgaard, I. Stensgaard, and F. Besenbacher, Physics Department and I-NANO, University of Aarhus, DENMARK; P. Jiang, A. Gourdon, and C. Joachim CEMES-CNRS, Toulouse, FRANCE. ♣

**G7.34**

LOCAL DYNAMICS OF POLYMERS IN INTERCALATED ORGANIC/INORGANIC NANOSTRUCTURES. Virkam Kuppa, Evangelos Manias, Penn State University, Dept of Materials Science & Engineering, University Park, PA.

**G7.35**

CASIMIR FORCES BETWEEN NANOPARTICLES AND SUBSTRATES. Carlos E. Roman-Velazquez, CICATA, Mexico D.F., MEXICO; Cecilia Noguez, Carlos Villarreal, and Raul Esquivel-Sirvent. Instituto de Fisica, UNAM, Mexico D.F., MEXICO.

**G7.36**

OBSERVATION OF THE MORPHOLOGY OF ZnO:Al NANOCOATING BY PULSED LASER DEPOSITION ON ZnS:Ag PHOSPHOR FOR DEGRADATION REPRESSION. Sanshiro Nagare, Nara Machinery Co., Ltd, Tokyo, JAPAN; Mamoru Senna, Keio University, Faculty of Science and Technology, Yokohama, JAPAN; Michael Ollinger, Rajiv Singh, University of Florida, Department of Materials Science and Engineering, Gainesville, FL.

**G7.37**

MICROTWINNING AND TWIN RELATED STRUCTURES IN TEMPLATE SYNTHESIZED METAL NANOWIRES. Jinguo Wang, Mingliang Tian, Thomas E. Mallouk and Moses H.W. Chan, Materials Research Institute and Center for Collective Phenomena in Restricted Geometries, Penn State University, University Park, PA.

**G7.38**

ION BEAM CHANNELING CHARACTERIZATION OF SPATIAL STRUCTURES OF SELF-ASSEMBLED InAs QUANTUM DOTS IN GaAs. Jie Zhu, Xiaotang Ren and Mengbing Huang, Univ at Albany-SUNY, Albany, NY.

**G7.39**

ETCHING OF CARBON NANOTUBES BY STEAM ACTIVATION. Rodney Andrews, Dali Qian, Rolando Gonzalez, David Jacques, University of Kentucky, Center for Applied Energy Research, Lexington, KY; Olivier de Verclos, University of Burgundy at Dijon, ESIREM Engineering School, FRANCE.

**G7.40**

ANALYSIS OF STACKING STRUCTURE OF CUP-STACKED TYPE CARBON NANOFIBERS. Kyoichi Oshida, Tatsuo Nakazawa, Kozo Osawa, Nagano National College of Technology, Nagano, JAPAN; Takuya Hayashi, Morinobu Endo, Faculty of Engineering, Shinshu Univ., Nagano, JAPAN.

**G7.41**

THE ELEMENT DEPTH PROFILES IN ULTRATHIN SILICON OXINITRIDE FILMS. I. Asanov, Y.S. Jung, J.Y. Won, J.H. Choi, J.C. Lee, C.B. Lim, Analytical Engineering Center, Samsung Advanced Institute of Technology, Suwon, KOREA; D.W. Moon, Nano Surface Group, Korea Research Institute of Standards and Science, Daejeon, KOREA.

**G7.42**

SYNTHESIS AND CHARACTERIZATION OF  $\text{Si}_{1-x}\text{Ge}_x$

NANOWIRES. K.W. Adu, R. Gupta, G.U. Sumanesakera, B.K. Pradhan, P.C. Eklund, Dept. of Physics, Pennsylvania State University, University Park, PA.

SESSION G8: SIZE DEPENDENT BEHAVIOR OF  
NANO PARTICLES

Wednesday Morning, December 4, 2002  
Room 200 (Hynes)

**8:30 AM G8.1**

NANOCALORIMETRIC CHARACTERIZATION OF THE SIZE DEPENDENT MELTING PROPERTIES OF CdSe QUANTUM DOTS. J. Rodriguez-Viejo, M. Chacon, A.F. Lopeandia, M.T. Clavaguera-Mora, Universidad Autonoma de Barcelona, Physics Dep., Bellaterra, SPAIN; Leonel R. Arana, K.F. Jensen, Dep. of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, MA; H. Mattoussi, U.S. Naval Research Lab, Optical Science Division, Washington, DC.

**8:45 AM G8.2**

ADVANCED <sup>13</sup>C NUCLEAR MAGNETIC RESONANCE INVESTIGATION OF METAL-LIGAND INTERACTIONS IN MONOLAYER-PROTECTED GOLD NANOPARTICLES: NMR SHIFTS AND RELAXATIONS. Brian S. Zelakiewicz, YuYe Tong, Georgetown University, Department of Chemistry, Washington, DC.

**9:00 AM G8.3**

NOVEL PHENOMENA OF ELECTRIC PERMITTIVITY OF NANO-COMPOSITE. Jin-Ho Kang, Chan Eon Park, Pohang University of Science and Technology, Polymer Research Institute, Department of Chemical Engineering, Division of Electrical and Computer Engineering, Pohang, KOREA.

**9:15 AM G8.4**

TRANSITION FROM MOLECULAR/AMORPHOUS TO POLYCRYSTALLINE BEHAVIOR IN Si NANOPARTICLES. G. Belomoin, J. Therrien, M.H. Nayfeh, Univ of Illinois, Dept of Physics, Urbana, IL; M. Alsalhi, A.Al Aql, King Saud Univ, Dept of Physics, Riyadh, SAUDI ARABIA.

**9:30 AM G8.5**

STRUCTURAL AND ELEMENTAL CHARACTERIZATION OF Fe/Co NANO-PARTICLES PRODUCED THROUGH ORGANOMETALLIC SYNTHESIS. P.L. Fejes, Motorola Inc., Semiconductor Products Sector, Tempe, AZ; F. Dumestre, C. Amiens, LCC-CNRS, Toulouse, FRANCE; P. Renaud, Motorola Inc., Semiconductor Products Sector, Toulouse, FRANCE; B. Chaudret, LCC-CNRS, Toulouse, FRANCE; P. Zurcher, Motorola Inc., Semiconductor Products Sector, Tempe, AZ.

**9:45 AM G8.6**

TEM INVESTIGATIONS OF SHELL/CORE STRUCTURE OF BORON-OXIDE-COATED Fe(B) NANOCAPSULES. J.G Zheng, Electron Probe Instrumentation Center, Department of Materials Science and Engineering, Northwestern University, Evanston, IL; Z.D. Zhang, J.L. Yu, Shenyang National Laboratory for Materials Science and International Center for Materials Physics, Institute of Metal Research, Academic Sinica, Shengyang, P.R. CHINA; V.P. Dravid, Electron Probe Instrumentation Center, Department of Materials Science and Engineering, Northwestern University, Evanston, IL.

**10:00 AM BREAK**

**10:30 AM G8.7**

THE USE OF SURFACE ENHANCED RAMAN SCATTERING FOR THE DETECTION OF DIPICOLINIC ACID ON SILVER NANOPARTICLES. Joseph Miragliotta, Terry E. Phillips, Peter F. Scholl, Johns Hopkins University, Applied Physics Laboratory, Laurel, MD.

**10:45 AM G8.8**

OPTICAL GAIN AND STIMULATED EMISSION IN SILICON NANOCRYSTALS. L. Dal Negro<sup>a</sup>, M. Cazzanelli<sup>a</sup>, N. Daldosso<sup>a</sup>, Z. Gaburro<sup>a</sup>, L. Pavesi<sup>a</sup>, F. Priolo<sup>b</sup>, G. Franzo<sup>b</sup>, D. Pacifici<sup>b</sup> and F. Iacona<sup>c</sup>; <sup>a</sup>INFN-Dipartimento di Fisica, Università di Trento, Povo, ITALY; <sup>b</sup>INFN-Dipartimento di Fisica, Università di Catania, Catania, ITALY; <sup>c</sup>CNR-IMM, Catania, ITALY.

**11:00 AM G8.9**

SURFACE MODIFICATION AND OPTICAL BEHAVIOR OF TiO<sub>2</sub> NANOSTRUCTURES. S.M. Prokes, Naval Research Laboratory, Washington, DC; James L. Gole, Department of Physics, Georgia Institute of Technology, Atlanta, GA; Chunxing She and T. Lian, Department of Chemistry, Emory University, Atlanta, GA.

**11:15 AM G8.10**

ORGANIC LIGHT EMITTING DEVICES FABRICATED FROM SEMICONDUCTING NANOSPHERES. Thomas Piok, Stefan Gamerith, Christoph Gadermaier, Emil J.W. List, Christian Doppler Laboratory, Advanced Functional Materials, Institute of Solid State Physics, Graz University of Technology, Graz, AUSTRIA, and Institute of Nanostructured Materials and Photonics, Weiz, AUSTRIA; Ullrich Scherf, Institute of Physical Chemistry, University of Potsdam, Golm, GERMANY; Katharina Landfester, Max Planck Institute of Colloids and Interfaces, Research Campus Golm, Potsdam, GERMANY.

**11:30 AM G8.11**

INFLUENCE OF SUBSTRATE ON IN-PLANE ELECTRICAL CONDUCTION OF CuPc NANO-CRYSTALS. Masakazu Nakamura, Tsuyoshi Maruyama, Masatoshi Watanabe, Masaaki Iizuka, Kazuhiro Kudo, Chiba Univ, Dept of Electronics and Mechanical Engineering, Chiba, JAPAN. ♣

SESSION G9/NN6: JOINT SESSION  
NANO AND MOLECULAR ELECTRONICS

Chair: Dawn A. Bonnell  
Wednesday Afternoon, December 4, 2002  
Room 200 (Hynes)

**1:30 PM \*G9.1/NN6.1**

ELECTRONIC CHARACTERIZATION OF SINGLE DEFECTS IN ONE-DIMENSIONAL NANOSTRUCTURES. A.T. Johnson, Marcus Freitag, University of Pennsylvania, Dept of Physics and Astronomy, Philadelphia, PA; Sergei V. Kalinin, Dawn A. Bonnell, University of Pennsylvania, Dept of Materials Science and Engineering, Philadelphia, PA.

**2:00 PM G9.2/NN6.2**

AFM-BASED ELECTRICAL CHARACTERIZATION OF NANOSTRUCTURES. Sandra B. Schujman, Sujit K. Biswas, Dept. of Physics, Applied Physics and Astronomy; Robert Vajtai, Bingqing Wei, Dept. of Materials Science and Engineering; Leo J. Schowalter, Dept. of Physics, Applied Physics and Astronomy; Pulickel M. Ajayan, Dept. of Materials Science and Engineering, Rensselaer Polytechnic Institute, Troy, NY.

**2:15 PM G9.3/NN6.3**

INTERFACE EFFECTS ON ELECTRICAL PROPERTIES OF CARBON NANOTUBES. Pridhudev Manghat, Jaewu Choi, Dept of Electrical and Computer Engineering, Wayne State Univ, Detroit, MI.

**2:30 PM G9.4/NN6.4**

NEGATIVE DIFFERENTIAL RESISTANCES IN NANOMECHANICAL DOUBLE BARRIER TUNNELING JUNCTIONS WITH C<sub>60</sub> MOLECULES AT ROOM TEMPERATURE. Kouhei Nagano<sup>a</sup>, Yasuo Azuma<sup>a</sup>, Yutaka Majima<sup>a,b</sup>; <sup>a</sup>Tokyo Institute of Technology, Dept. of Physical Electronics, <sup>b</sup>Organization and Function, PRESTO, Japan Science and Technology Corporation (JST), Tokyo, JAPAN.

**2:45 PM G9.5/NN6.5**

QUANTUM CONFINEMENT ON THE VIBRATIONAL PROPERTIES OF SILICON NANOWIRES. C.K.A. Adu, G.U. Sumanesakera, B.K. Pradhan, and P.C. Eklund, Dept. of Physics, Pennsylvania State University, University Park, PA; J.E. Fischer, Department of Material Science and Engineering and Laboratory for Research on the Structure of Matter, University of Pennsylvania, Philadelphia, PA.

**3:00 PM BREAK**

**3:30 PM G9.6/NN6.6**

PERIODIC ARRAYS OF INTRAMOLECULAR JUNCTIONS OF SILICON NANOWIRES. Duoduo Ma, Shuitong Lee, City Univ of Hong Kong, Dept of Physics and Materials Science, Hong Kong, CHINA.

**3:45 PM G9.7/NN6.7**

SINGLE MOLECULE SWITCHES. Z.J. Donhauser, P.S. Weiss, The Pennsylvania State University, University Park, PA.

**4:00 PM G9.8/NN6.8**

SCANNING TUNNELING SPECTROSCOPY OF SINGLE COMPLEX MOLECULES AND ORDERED MOLECULAR NANOSTRUCTURES AT ROOM TEMPERATURE. Federico Rosei, Y. Naitoh, M. Schunack, E. Legsgaard, I. Stensgaard, and F.

Besenbacher, Physics Department and I-NANO, University of Aarhus, DENMARK; P. Jiang, A. Gourdon, and C. Joachim CEMES-CNRS, Toulouse, FRANCE.

**4:15 PM G9.9/NN6.9**

SINGLE MOLECULAR CONDUCTIVITY OF ORDERED NANOWIRES. M. Hadi Zareie, Hong Ma, Bryan W. Reed, Alex Jen, and Mehmet Sarikaya, Materials Science and Engineering, University of Washington, Seattle, WA.

**4:30 PM G9.10/NN6.10**

ELECTRON TRANSPORT THROUGH CONJUGATED ORGANIC MOLECULES. Ganesh K. Ramachandran, John K. Tomfohr, Otto F. Sankey and Stuart M. Lindsay, Department of Physics and Astronomy, Arizona State University, Tempe, AZ; Xristo Zarate, Alex Primak, Tom A. Moore, Ana L. Moore and Devens Gust, Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ; and Larry A. Nagahara, Physical Sciences Research Laboratory, Motorola Labs, Tempe, AZ.

**4:45 PM G9.11/NN6.11**

COMBINED STM, UPS AND THEORETICAL INVESTIGATIONS OF THE ELECTRONIC COUPLING EFFICIENCY OF VARIOUS ANCHORING GROUPS FOR MOLECULAR ELECTRONICS. L. Patrone, S. Palacin, F. Armand, J.P. Bourgoin, Service de Chimie Moléculaire, CEA Saclay, FRANCE; J. Lagoute, S. Gauthier, H. Tang, CEMES CNRS, Toulouse, FRANCE; N. Stuhr-Hansen, T. Bjornholm, Department of Chemistry, Copenhagen University, DENMARK.

SESSION G10: BIOLOGICAL SYSTEMS AT THE NANOSCALE

Chair: Paul S. Weiss

Thursday Morning, December 5, 2002  
Room 200 (Hynes)

**8:45 AM G10.1**

FLUORESCENT NANOCRYSTAL PROBES FOR CELL SURFACE RECEPTORS. Sandra J. Rosenthal, Ian Tomlinson, Jon Burton, Jesse Grey, Department of Chemistry, Vanderbilt University, Jon Mason, Paul Gresch, Elaine Sanders-Bush, Lou DeFelice, and Randy Blakely, Department of Pharmacology and Center for Molecular Neuroscience, Vanderbilt University Medical School, Nashville, TN.

**9:00 AM G10.2**

AFM STUDY OF MECHANICAL AND STRUCTURAL PROPERTIES OF STRATUM CORNEUM. Yonghui Yuan, Ritu Verma, Unilever Research, Edgewater, NJ.

**9:15 AM G10.3**

DISCRIMINATION OF BIOMOLECULAR CONFORMATION USING THE SCANNING KELVIN PROBE TECHNIQUE. Douglas C. Hansen, Princeton Applied Research, Oak Ridge, TN; Karolyn M. Hansen, Thomas L. Ferrell and Thomas G. Thundat, Oak Ridge National Laboratory, Life Sciences Division, Oak Ridge, TN.

**9:30 AM \*G10.4**

SEGMENTED NANOFIBERS OF SPIDER DRAGLINE SILK: ATOMIC FORCE MICROSCOPY AND SINGLE-MOLECULE FORCE SPECTROSCOPY. Helen Hansma, Emin Oroudjev, Univ of California, Dept of Physics, Santa Barbara, CA.

**10:00 AM BREAK**

SESSION G11: LOCAL PROPERTIES OF SAMs

Chair: Paul S. Weiss

Thursday Morning, December 5, 2002  
Room 200 (Hynes)

**10:30 AM G11.1**

Transferred to G13.16

**10:45 AM G11.2**

MORPHOLOGY AND POLAR ORDER IN SELF-ASSEMBLED THIN FILMS OF OVERCROWDED ARENES STUDIED BY SCANNING PROBE MICROSCOPY. Thuc-Quyen Nguyen, Colin Nuckolls, Louis Brus, Chemistry Department, Columbia University, New York, NY. ♣

**11:00 AM G11.3**

SCANNING PROBE MICROSCOPY OF SELF-ASSEMBLED MONOLAYERS OF PHENYLENE/ETHYNYLENE MOLECULES. R. Ross Getty, Simona Percec, Kenneth G. Sharp, Roger H. French,

Paula B. Hietpas, Gregory S. Blackman, DuPont Experimental Station, Wilmington, DE; Tony Alvarez, Dawn A. Bonnell, Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA. ♣

**11:15 AM G11.4**

SURFACE POTENTIAL IMAGING MECHANISMS OF SELF-ASSEMBLED MONOLAYERS. Tony Alvarez, Dawn Bonnell, Univ of Pennsylvania, Dept of Materials Science and Engineering, Philadelphia, PA; R. Ross Getty, DuPont Experimental Station, Wilmington, DE. ♣

**11:30 AM G11.5**

SFM AND TOF-SIMS STUDY OF UNCONVENTIONAL SELF-ORGANIZATION PHENOMENA IN MIXED LB MONOLAYERS. Bruno Pignataro, Laura Sardone, Antonino Licciardello, Giovanni Marletta, Dept of Chemical Science, Catania, ITALY.

SESSION G12: OPTICAL PROBES OF NANOSTRUCTURES

Chair: Ludwig J. Balk

Thursday Afternoon, December 5, 2002  
Room 200 (Hynes)

**1:30 PM G12.1**

WAVELENGTH-DEPENDENT RAMAN SCATTERING AND PHOTOLUMINESCENCE OF HYDROGENATED AMORPHOUS SILICON CARBON FOR A CHARACTERIZATION OF CLUSTER SIZE DEPENDENT PHENOMENA. Minseo Park, V. Sakhrani, J.J. Cuomo, Department of Materials Science and Engineering, North Carolina State University, Raleigh, NC; B.J. Rodriguez, R.J. Nemanich, Department of Physics, North Carolina State University, Raleigh, NC; C.W. Teng, J.F. Muth, Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC.

**1:45 PM G12.2**

MICRO-RAMAN SPECTROSCOPY OF SILICON NANOCRYSTALS PRODUCED BY PICOSECOND PULSED LASER ABLATION. M.H. Wu, A. Ueda, R. Mu, D.O. Henderson, Dept of Physics, Fisk University, Nashville, TN.

**2:00 PM \*G12.3**

IMMERSION LENS MICROSCOPY OF PHOTONIC NANOSTRUCTURES AND QUANTUM DOTS. M. Selim Ünlü, S.B. Ippolito, Z. Liu, B.B. Goldberg, Boston Univ, Photonics Center, Dept of Physics and Electrical Engineering, Boston, MA; Lukas Novotny, Univ of Rochester, Institute of Optics.

**2:30 PM G12.4**

CONFOCAL OPTOELECTRONIC HOLOGRAPHY MICROSCOPE FOR MATERIALS AND STRUCTURAL CHARACTERIZATION OF MEMS. Adam M. Siegel, Cosme Furlong, and Ryszard J. Pryputniewicz, Mechanical Engineering Department/CHSLT-NEST, Worcester Polytechnic Institute, Worcester, MA.

**2:45 PM G12.5**

STRUCTURE AND STABILITY OF COLLOIDAL NETWORKS IN VISCOELASTIC FLUIDS. Maria L. Kilfoil, David A. Weitz, Harvard University, Div of Engineering and Applied Sciences, Cambridge, MA; Eugene Pashkovski, Colgate-Palmolive, Piscataway, NJ.

**3:00 PM BREAK**

**3:30 PM G12.6**

USING A CONFOCAL MICROSCOPE SHEAR CELL TO STUDY DISLOCATION MOTION IN A RANDOM-CLOSE-PACKED COLLOIDAL SUSPENSION. Itai Cohen, David Weitz, Harvard University, Dept of Engineering and Applied Sciences, Cambridge, MA; Thomas G. Mason, Exxon Mobile Research and Engineering Co., Annandale, NJ.

**3:45 PM \*G12.7**

THE PHOTOCHEMISTRY, STRUCTURE AND DYNAMICS OF DELOCALIZED CHARGES AND TRIPLET EXCITONS IN ORGANIC THIN FILMS. Paul Barbara, Jason McNeill, Doo Young Kim, Robin Lammi, and Ji Yu, Dept of Chemistry & Biochemistry and the Center for Nano- and Molecular Science and Technology, University of Texas, Austin, TX.

**4:15 PM G12.8**

NEAR-FIELD OPTICAL SPECTROSCOPY OF GOLD BASED-NANOSTRUCTURES. A.A. Mikhailovsky, A.P. Bartko, M.A. Petruska and V.I. Klimov, Chemistry Division, Los Alamos National Laboratory, Los Alamos, NM.

**4:30 PM G12.9**

HIGH-RESOLUTION THERMOREFLECTANCE MICROSCOPY. Shawn Thorne, Stephen Ippolito, Selim Unlu, Boston University, Dept of Electrical and Computer Engineering, Boston, MA; Bennett Goldberg, Boston University, Dept of Physics, Boston, MA.

SESSION G13: POSTER SESSION  
Thursday Evening, December 5, 2002  
8:00 PM

Exhibition Hall D (Hynes)

**G13.1**

SPATIALLY RESOLVED CHARACTERIZATION OF ELECTROMIGRATION-INDUCED PLASTIC DEFORMATION IN Al(0.5wt% Cu) INTERCONNECTS. Rosa I. Barabash, Gene E. Ice, Metals & Ceramics Division, ORNL, Oak Ridge, TN; Nobumichi Tamura, Advanced Light Source, Berkeley, CA; Bryan C. Valek, John C. Brawman, Dept. Materials Science & Engineering, Stanford University, Stanford, CA; Jim R. Patel, Advanced Light Source, Berkeley and Stanford Synchrotron Radiation Laboratories, CA.

**G13.2**

Abstract Withdrawn

**G13.3**

IN-SITU TEM OBSERVATIONS OF PHASE TRANSFORMATION ON FePt-Cu NANOPARTICLES. Xiang-Cheng Sun, D.E. Nikles, S.S. Kang, J.W. Harrell, Center for Materials for Information Technology (MINT), The University of Alabama, Tuscaloosa, AL; Z.R. Dai, Z.L. Wang, School of Materials Science and Engineering, Georgia Institute of Technology, Atlanta, GA.

**G13.4**

STRUCTURE AND ELECTRONIC PROPERTIES OF MOLECULARLY-CAPPED METAL NANOPARTICLES: THE EFFECT OF NANO-SIZE, METAL CORE AND CAPPING MOLECULES PROBED BY X-RAY ABSORPTION FINE STRUCTURE. Peng Zhang, Tsun Kong Sham, Univ of Western Ontario, Dept of Chemistry, London, Ontario, CANADA.

**G13.5**

SUBSTRATE DEPENDENCE OF SURFACE PLASMON RESONANCE FREQUENCY OF SILVER ISLAND FILMS. Gang Xu, Masato Tazawa, Ping Jin, AIST, Nagoya, JAPAN.

**G13.6**

A STUDY OF ULTRATHIN SiO<sub>2</sub> FILMS ON SILICON BY SCANNING TUNNELING MICROSCOPY AND SPECTROSCOPY. K. Xue, J.B. Xu, M.S. Xu, J. An, J. He, R.W.M. Kwok<sup>a</sup>, I.H. Wilson, and R.A.Devine<sup>a,b</sup>, Department of Electronic Engineering, and Materials Science and Technology Research Center, The Chinese University of Hong Kong; <sup>a</sup>Department of Chemistry, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong SAR; <sup>b</sup>Center for High Technology Materials, University of New Mexico, Albuquerque, NM.

**G13.7**

ATOMIC AND ELECTRONIC STRUCTURES OF Au/TiO<sub>2</sub> CATALYST – FIRST-PRINCIPLE CALCULATION. Kazuyuki Okazaki, Shingo Tanaka (SWING), Satoshi Ichikawa, Koji Tanaka, Masanori Kohyama, National Institute of Advanced Industrial Science and Technology (AIST), Special Division of Green Life Technology, Osaka, JAPAN; Yoshitada Morikawa, National Institute of Advanced Industrial Science and Technology (AIST), Research Institute for Computational Sciences, Tsukuba, JAPAN.

**G13.8**

STRAIN RELAXATION OF STRAINED-Si LAYERS ON SiGe-ON-INSULATOR(SGOI) STRUCTURES AFTER MESA ISOLATION. Koji Usuda, Tomohisa Mizuno, Tsutomu Tezuka, Naoharu Sugiyama, Yoshihiko Moriyama, Shu Nakaharai, and Shin-ichi Takagi, MIRAI Project, ASET, Kawasaki, JAPAN.

**G13.9**

MAGNETIC DOMAIN STRUCTURES IN CoNiFe THIN FILMS AND LINES. Lucas Perez, Oscar de Abril, M.C. Sanchez-Trujillo, Eloisa Lopez, Universidad Complutense, Dept Fisica de Materiales, Madrid, SPAIN; Claudio Aroca, Pedro Sanchez, Universidad Politecnica, ISOM and Dpt. Fisica Aplicada, Madrid, SPAIN.

**G13.10**

NUMERICAL MODELING OF IN-PLANE EFFECTS IN INTERMITTENT CONTACT ATOMIC FORCE MICROSCOPY.

Matthew S. Marcus, M.A. Eriksson, Univ of Wisconsin-Madison, Dept of Physics, Madison, WI; Darryl Y. Sasaki, Sandia National Laboratories, Biomolecular Materials and Interface Science, Albuquerque, NM; Robert W. Carpick, Univ of Wisconsin-Madison, Dept of Engineering Physics, Materials Science Program, and Rheology Research Center, Madison, WI.

**G13.11**

ATOMIC AND ELECTRONIC STRUCTURES OF NANO-INTERFACE IN Au/TiO<sub>2</sub> CATALYST – ELECTRON MICROSCOPIC APPROACH. Satoshi Ichikawa, Kazuyuki Okazaki, Tomoki Akita, Mitsutaka Okumura, Koji Tanaka, Masanori Kohyama, National Institute of Advanced Industrial Science and Technology, AIST-Kansai, Osaka, JAPAN.

**G13.12**

TRANSFORMATION OF TEXTURE AND GRAIN BOUNDARY CHARACTER DISTRIBUTION IN ANNEALED NANO-CRYSTALLINE MATERIALS. Bae-Kyun Kim, Jerzy A. Szipunar, McGill Univ, Dept of Mining, Metals and Metallurgical Engineering, Montreal, CANADA; Alex P. Zhilyaev, Ufa State Aviation Tech Univ, Institute for Physics of Advanced Materials, Ufa, RUSSIA.

**G13.13**

SURFACE FORCE MEASUREMENT WITH NANO-SIZED COLLOIDAL PROBE. Jeong-Min Cho, Wolfgang M. Sigmund, University of Florida, Dept. of Materials Science and Engineering, Gainesville, FL.

**G13.14**

SPATIALLY-RESOLVED ELECTRICAL PROPERTIES OF InAs/InP NANOSTRUCTURES. K.O. Vicaro, H.R. Gutiérrez and M.A. Cotta, DFA/LPD, IFGW, UNICAMP, Campinas, São Paulo, BRAZIL.

**G13.15**

DESIGN AND ANALYSIS OF MICRO-CANTILEVERS FOR BIOSENSING APPLICATIONS. Cengiz S. Ozkan, Kambiz Vafai, University of California, Riverside, Mechanical Engineering Department, Riverside, CA.

**G13.16**

CHEMICAL FORCE MICROSCOPIC STUDY OF UV EXCIMER LASER IRRADIATED POLYAMIDE. Joanne Yip, K. Chan, K.M. Sin, Institute of Textiles & Clothing, The Hong Kong Polytechnic University, HONG KONG; K.S. Lau, Department of Applied Physics, The Hong Kong Polytechnic University, HONG KONG.

SESSION G14/NN8: JOINT SESSION  
PROCESSING AND PROPERTIES OF NANOWIRES  
Chair: Andrew P. Shreve  
Friday Morning, December 6, 2002  
Room 200 (Hynes)

**8:30 AM G14.1/NN8.1**

RAMAN-ACTIVE PHONONS IN POLAR SEMICONDUCTING NANOWIRES. G.D. Mahan and P.C. Eklund, Dept of Physics, Penn State University, University Park, PA.

**8:45 AM G14.2/NN8.2**

DUAL-PROBE SCANNING TUNNELING MICROSCOPE AND A CARBON NANOTUBE RING TRANSISTOR. Taishi Shigematsu, Hiroyuki Watanabe, Chikara Manabe, Kei Shimotani, Masaaki Shimizu, Advanced Research Lab., Corporate Research Center, Fuji Xerox Co., Ltd., Kanagawa, JAPAN.

**9:00 AM G14.3/NN8.3**

TRIPLE-PROBE ATOMIC FORCE MICROSCOPE: MEASURING A CARBON NANOTUBE/DNA MIS-FET. Kei Shimotani, Hiroyuki Watanabe, Taishi Shigematsu, Chikara Manabe, Masaaki Shimizu, Advanced Research Lab., Corporate Research Center, Fuji Xerox Co., Ltd., Kanagawa, JAPAN.

**9:15 AM G14.4/NN8.4**

TEXTURE-CONTROLLED ELECTROCHEMICAL GROWTH AND CHARACTERIZATION OF METALLIC NANOWIRES. Mingliang Tian, Jinguo Wang, James Kurtz, Thomas E. Mallouk, and Moses H.W. Chan, Penn State Univ, Center for Collective Phenomena in Restricted Geometries, and the Materials Research Institute, University Park, PA.

**9:30 AM G14.5/NN8.5**

DYNAMICAL EVOLUTION OF GOLD NANOWIRE FORMATION. Pablo Z. Coura, Socrates de O. Dantas, Univ. Fed. de Juiz de Fora,

Departamento de Física, Juiz de Fora, BRAZIL; Douglas S. Galvao, UNICAMP, Instituto de Física Gleb Wataghin, Campinas, BRAZIL; Varlei Rodrigues, Daniel Ugarte, Laboratório Nacional de Luz Síncrotron, Campinas, BRAZIL.

**9:45 AM G14.6/NN8.6**

THE ROLE OF CARBON CONTAMINATION IN SUSPENDED GOLD NANOWIRES. Sergio B. Legoas, Douglas S. Galvao, Applied Physics Department, State University of Campinas, Campinas, SP, BRAZIL; Varlei Rodrigues, Daniel Ugarte, Laboratório Nacional de Luz Síncrotron, Campinas, SP, BRAZIL.

**10:00 AM BREAK**

**10:30 AM G14.7/NN8.7**

FIELD EMISSION FROM PEAPODS (FILLED SINGLE WALL CARBON NANOTUBE SYSTEMS). Richard M. Russo, Siddhartha Kar, Christine Sung, David E. Luzzi, Dept of Materials Science and Engineering, University of Pennsylvania, Philadelphia, PA.

**10:45 AM G14.8/NN8.8**

EFFECTS OF SINGLE-WALLED CARBON NANOTUBES ON THE CHARGE TRANSPORT PROPERTIES OF POLYFLUORENE DERIVATIVE POLYMERS. H. Lu, S. Webster, L. Zheng, R. Czerw, J. Ballato, D.L. Carroll, Clemson Univ, Dept of Materials Science and Engineering, Clemson, SC.

SESSION G15: PROCESSING AND PROPERTIES OF HETEROGENEOUS NANOSTRUCTURES

Chair: Andrew P. Shreve  
Friday Morning, December 6, 2002  
Room 200 (Hynes)

**11:00 AM G15.1**

TEM STUDY OF RADIATION-INDUCED NANOPHASE FORMATION IN SOLIDS. L.M. Wang and R.C. Ewing, Department of Nuclear Engineering and Radiological Sciences, The University of Michigan, Ann Arbor, MI.

**11:15 AM G15.2**

MICROSTRUCTURE OF PRECIPITATED Au NANOCCLUSERS IN SINGLE CRYSTAL MgO. C.M. Wang, S. Thevuthasan, V. Shutthanandan, A. Cavanagh, J. Walton, W. Jiang, W.J. Weber, and L.E. Thomas, Pacific Northwest National Laboratory, Richland, WA; L.M. Wang and J. Lian, Department of Nuclear Engineering and Radiological Sciences, The University of Michigan, Ann Arbor, MI.

**11:30 AM G15.3**

QUANTITATIVE MORPHOLOGY OF ALUMINUM SILICATE NANOAGGREGATES. Giovanni F. Crosta, Department of Environmental Sciences, University of MI-Bicocca, Milan, ITALY; Changmo Sung, Bongwoo Kang, Carolina Ospina, Center for Advanced Materials, University of Massachusetts-Lowell, Lowell, MA; Peter J. Stenhouse, U.S. Army Natick Soldier Center, Natick, MA.

**11:45 AM G15.4**

SYNTHESIS, CHARACTERIZATION AND CATALYTIC APPLICATION OF METAL DOPED NANOPOROUS CARBON. Ponnaiyan Ayyappan and Henry C. Foley, Dept of Chemical Engineering, University Park, PA.