



Symposium 20
BEAMS AND MATERIALS: ION BEAMS

CHAIRS

Sandip Dhara

Materials Science Group, Indira Gandhi Centre for Atomic Research, Kalpakkam-603 102, India

Chang-Yong Nam

Center for Functional Nanomaterials (CFN), Brookhaven National Laboratory (BNL).

Carsten Ronning

University of Jena

Alicia Oliver

Instituto de Física, UNAM

Michael Nastasi

Los Alamos, USA

WEDNESDAY, AUGUST 19
ROOM COZUMEL

MORNING SESSION

S20-1 9:00-9:30 INVITED TALK

ION BEAM FORMATION AND MODIFICATION OF ELEMENTAL METALLIC NANOPARTICLES

D.J. Sprouster¹, R. Giuliani¹, C.S. Schnoher¹, L.L. Araujo¹, D.J. Llewellyn¹, P. Kluth¹, A.P. Byrne¹, G.J. Foran², B. Johannessen², D.J. Cookson² and M.C. Ridgway¹

¹Research School of Physics and Engineering, Australian National University, Canberra, Australia ²Australian Synchrotron, Clayton, Australia

S20-2 9:30-10:00 INVITED TALK

MODIFICATION OF THE STRUCTURE OF NANO-COMPOSITES BY SWIFT HEAVY ION IRRADIATION

J.C. Pivin¹, F. Singh², D.K. Avasthi², J.P. Stoquert³

1- CSNSM-IN2P3, Bat. 108, 91405 Orsay Campus, France
pivin@csnsm.in2p3.fr 2- IUAC, Post Box 10502, Aruna Asaf Ali Marg, New Delhi 110067, India 3- InESS, UMR 7163 CNRS-ULP, BP20, 67037 Strasbourg Cedex 2, France

S20-3 10:00-10:30 INVITED TALK

ION BEAM NANOPATTERNING OF METAL NANOPARTICLES TOWARDS PLASMONICS

N. Kishimoto¹, B. Zheng¹, D.P. Datta¹, J. Pan², Y. Takeda¹

¹Quantum Beam Center, National Institute for Materials Science (NIMS), 3-13 Sakura, Tsukuba 305-0003, Japan. ²Futong Group Co.,Ltd, Sumitomo Electric Industries, Futong, China. E-mail: KISHIMOTO.Naoki@nims.go.jp

S20-4 10:30-10:45

NANO-PATTERNING ON SILICA BY ACCELERATED In²⁺ ION BEAM AND ITS STABILITY UNDER THERMAL TREATMENT AND ION IRRADIATIONS

P. Santhana Raman^{1,2}, K.G.M. Nair¹, M. Kamruddin¹, A.K. Tyagi¹, Jay Ghatak³, Umananda M. Bhatta³, P.V. Satyam³, B.K. Panigrahi¹ and V. Ravichandran²

¹ Materials Science Group, Indira Gandhi Centre for Atomic Research, Kalpakkam 603102, India ² Materials Science Centre, Department of Nuclear Physics, University of Madras, Chennai 600 025, India ³ Institute of Physics, Sachivalaya Marg, Bhubaneswar 751 005, India

S20-5 10:45-11:00

LARGE AND ANISOTROPIC THIRD-ORDER NONLINEAR OPTICAL RESPONSE FROM ANISOTROPY-CONTROLLED METALLIC NANOCOMPOSITES

J. A. Reyes-Esqueda¹, V. Rodríguez-Iglesias¹, H. G. Silva-Pereyra¹, C. Torres-Torres², A. L. Santiago-Ramírez¹, J. C. Cheang-Wong¹, A. Crespo-Sosa¹, L. Rodríguez-Fernández¹, A. López-Suárez², and A. Oliver¹

¹Instituto de Física, Universidad Nacional Autónoma de México, México, D. F. 04510, México. ²Sección de Estudios de Posgrado e Investigación ESIME-Zacatenco, Instituto Politécnico Nacional, México, D. F. 07338, México. reyes@fisica.unam.mx

11:00 – 11:30

COFFEE BREAK

11:30 – 12:30

PLENARY 2

S20-6 12:30-13:00 INVITED TALK

ATOMISTIC SIMULATIONS OF RADIATION DAMAGE IN NANOGRAINS

Yi Yang¹, Hanchen Huang^{1,2}, and Steven Zinkle³

¹ Rensselaer Polytechnic Institute; ² University of Connecticut; and ³ Oak Ridge National Lab. E-mail correspondence: hanchen@enr.uconn.edu

S20-7 13:00-13:30 INVITED TALK

DIAGNOSTIC ANALYSIS OF ION-BEAM INDUCED NANOSTRUCTURES BY S/TEM-EELS

S. Muto

Graduate School of Engineering, Nagoya University, Chikusa-ku, Nagoya 464-8603, Japan. E-mail: s-mutoh@nucl.nagoya-u.ac.jp

S20-8 13:30-13:45

DETERMINATION OF SIZE AND SHAPE DISTRIBUTIONS OF Au NANOPARTICLES EMBEDDED IN SILICA BY THE T-MATRIX METHOD

J. Huelgas-Moreno, H.G. Silva-Pereyra, J. Arenas-Alatorre, J.A. Reyes-Esqueda, L. Rodríguez-Fernández, A. Crespo-Sosa, J.C. Cheang-Wong, A. Oliver. Instituto de Física, Universidad Nacional Autónoma de México. Apto. Postal 20-364, 01000 México D.F.

S20-9 13:45-14:00

PHASES TRANSFORMATIONS INDUCED BY RADIATION USING HIGH VOLTAGE TRANSMISSION ELECTRON MICROSCOPE.

“SOME PECULIARITIES IN THE BEHAVIOR OF MATERIALS UNDER THE EFFECT OF A FLOW OF HIGH-ENERGY ELECTRONS”

P. Tamayo¹, V. Yermishkin², Pablo Schabes Reichkiman³.

¹Instituto Politécnico Nacional, Sección de Estudios de Posgrado, Escuela Superior de Ingeniería Mecánica y Eléctrica, Av. De las Granjas N° 682, Col. Santa Catarina, México, DF.



²Instituto de Metalurgia BAIKOV, Academia de Ciencias de Rusia, Leninsky Propekt 49, Moscow, Federation of Russia. ³Instituto de Física, Universidad Nacional Autónoma de México

14:00-16:00 LUNCH

16:00-18:30 AFTERNOON SESSION

S20-10 16:00-16:30 INVITED TALK

APPLICATION OF ION BEAM FOR THERMOELECTRIC DEVICE FABRICATION: LAYERED SHEETS OF QUANTUM DOTS

D. ILA, R. L. Zimmerman, and C. I. Muntele,

Center for Irradiation of Materials, Alabama A&M University, PO Box 1447, Normal, Alabama, 35762-1447 USA,

Presenting author's email: ila@cim.aamu.edu, daryushila@aol.com

S20-11 16:30-17:00 INVITED TALK

WELDING METAL NANOSTRUCTURES WITH CARBON AND TRANSFORMING GRAPHENE EDGES USING ELECTRON IRRADIATION AND JOULE HEATING

Mauricio Terrones

Laboratory for Nanoscience and Nanotechnology Research and Advanced Materials Department, IPICYT; Camino a la Presa San José 2055, 78216 San Luis Potosí, SLP, México e-mail: mterrones@ipicyt.edu.mx

S20-12 17:00-17:30 INVITED TALK

FOCUSED ION AND ELECTRON BEAM NANOFABRICATION: NEW DEVELOPMENTS

John Melngailis*

University of Maryland. E-mail: *melng@umd.edu, Department of Electrical and Computer Engineering and Institute for Research in Electronics and Applied Physics, Tel. 301-405-4916

S20-13 17:30-17:45

ION BEAM LITHOGRAPHY FOR NANOSCALE DEVICE FABRICATION

J.E.E. Baglin

IBM Almaden Research Center, 650 Harry Rd., San Jose, CA 95120, USA.

E-mail: baglin@almaden.ibm.com

S20-14 17:45-18:00

DISORDER EFFECTS ON ELECTRICAL CONDUCTION OF FOCUSED-ION-BEAM DEPOSITED PT CONTACT ON GALLIUM NITRIDE NANOWIRES

Chang-Yong Nam¹, Douglas Tham², John E. Fischer³

¹Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, New York 11973, USA, ²Division of Engineering and Applied Science, California Institute of Technology, Pasadena, California 91125, USA,

³Department of Materials Science and Engineering, University of Pennsylvania, Philadelphia, Pennsylvania 19104, USA

S20-15 18:00-18:15

ION BEAM INDUCED ALIGNMENT OF SEMICONDUCTOR NANOWIRES

C. Borschel,¹ R. Niepelt,¹ S. Geburt,¹ C. Gutsche,² I. Regolin,² W. Prost,² F.-J. Tegude,² D. Stichtenoth,³ D. Schwen,³ and C. Ronning,^{1,*}

¹Institute for Solid State Physics, Friedrich-Schiller-University of Jena, Max-Wien-Platz 1, 07743- Jena, Germany ²Institute for Semiconductor Technology, University of Duisburg-Essen, Lotharstr. 55, 47057-Duisburg, Germany

³II. Institute of Physics, University of Göttingen, Friedrich-Hund-Platz 1, 37077-Göttingen, Germany ⁴Department of Materials Science and Engineering, University of Illinois @ Urbana-Champaign, 1304 W. Green St., Urbana, IL 61801, USA

S20-16 18:15-18:30

ABSORPTIVE CONTRIBUTIONS TO NANO- AND PICO-SECOND LASER ABLATION IN Ag NANOPARTICLES EMBEDDED IN ION-IMPLANTED SILICA

C. Torres-Torres¹, N. Peréa-López², J.A. Reyes-Esqueda³, J.C. Cheang-Wong³, A. Crespo-Sosa³, L. Rodríguez-Fernández³, A. Oliver³

¹Sección de Estudios de Posgrado e Investigación-ESIME-IPN, Zacatenco, D.F., 07738, México. ²Laboratory for Nanoscience and Nanotechnology Research (LINAN) and Advanced Materials Department, IPICYT, S.L.P., 78216, México. ³Instituto de Física, Universidad Nacional Autónoma de México, A.P. 20-364, México, D.F. 04510 E-mail: ctorrest@ipn.mx

18:30-20:30 POSTER SESSION & COFFEE BREAK

S20-P1

THE BINDING STATE OF INDIUM IN NATURAL CHALCOGENIDES: A XANES APPROACH THROUGH THE L₃ ABSORPTION EDGE

M.O. Figueiredo, T. Pereira da Silva

CENIMAT/I3N, Materials Sci. Dept., Faculty of Sci. Technol., New University of Lisbon, 2829-516 Caparica, and INETI/LNEG, Estrada da Portela, Apt. 7586, 2721-866 Alfragide, Portugal. E-mail: ondina.figueiredo@ineti.pt

S20-P2

CU DIFFUSION IN SODA-LIME GLASS ASSISTED BY MEV ION IRRADIATION

E. Flores-Romero, D. Cruz-Delgado, L. Rodríguez-Fernández

Instituto de Física, UNAM, Ciudad Universitaria, México, D.F., 04510 México. E-mail: floresr@fisica.unam.mx

S20-P3

FORMATION OF NANOPARTICLES OF Au IN ZnO THIN FILMS BY ION IRRADIATION AND THERMAL TREATMENT

D. R. Hernández-Socorro¹, L. Flores-Morales², H. Cruz-Manjarrez Flores¹, E. Flores-Romero¹, L. Rodríguez-Fernández¹

¹Instituto de Física, UNAM, Ciudad Universitaria, México, D.F., 04510 México. ²Facultad de Ciencias, UNAM, Departamento de Física, Ciudad Universitaria, México, D.F., 04510 México.

E-mail: socorro@fisica.unam.mx; dhsocorro@yahoo.com.ar

S20-P4

EFFECT OF Al IONS-IRRADIATION ON THE OPTICAL PROPERTIES α -Al₂O₃

L. Herrera-Colín*, A. García-Bórquez, J. Aguilar-Hernández.

Departamento de Ciencia de Materiales; Edif. 9 ESFM-IPN, UPALM 07738 México D.F. E-mail: lizherr@hotmail.com

S20-P5

NUCLEATION, GROWTH AND PHOTOLUMINESCENCE OF METALLIC NANOPARTICLES IN SAPPHIRE

J.L. Jiménez-Hernández¹, P. Mota-Santiago¹, A. Crespo-Sosa¹, A. Reyes¹, A. Olivier¹

¹Instituto de Física, Universidad Nacional Autónoma de México, AP 20-364, México DF 01000, México



S20-P6

DEVELOPMENT OF ARRAYS OF NANOSCALE SURFACE STRUCTURES USING ION-BEAM-MODIFIED MASKS OF SILICA PARTICLES

Eder Reséndiz, Juan-Carlos Cheang-Wong

Instituto de Física, Universidad Nacional Autónoma de México, A.P. 20-364, México D.F. 01000, Mexico. Email: eresendiz@fisica.unam.mx

S20-P7

REFRACTION INDEX STUDY DUE TO METALLIC NANOPARTICLES EMBEDDED IN SILICA MATRIX USING THE M-LINE METHOD

E. Flores-Romero¹, J.C. Cheang-Wong¹, A. Crespo-Sosa¹, A. Oliver¹, L. Rodríguez-Fernández¹

¹Instituto de Física, UNAM, Ciudad Universitaria, México, D.F., 04510 México. E-mail: floresr@fisica.unam.mx

S20-P8

STRUCTURAL, CHEMICAL AND ELECTRONIC CHARACTERIZATION OF SURFACES AND BURIED INTERFACES

J. Rubio-Zuazo and G.R.Castro

SpLine, Spanish CRG Beamline at the European Synchrotron Radiation Facility B.P. 220, 38043 Grenoble (FRANCIA), Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Científicas, Sor Juana Inés de la Cruz, Cantoblanco, Madrid, Spain. Email: rubio@esrf.fr, castro@esrf.fr

S20-P9

ELONGATION OF GOLD NANOPARTICLES IN SILICA BY IRRADIATION WITH MeV Si IONS

H.G. Silva-Pereyra, J. Huelgas-Moreno, J. Arenas-Alatorre, J.A. Reyes-Esqueda, L. Rodríguez-Fernández, A. Crespo-Sosa, J.C. Cheang-Wong, A. Oliver. Instituto de Física, Universidad Nacional Autónoma de México.

Apto. Postal 20-364, 01000 México D.F.

S20-P10

IRRADIATION INDUCED RE-SOLUTION AND GROWTH OF XENON NANO-BUBBLES SIMULATED BY FIRST PASSAGE MONTE CARLO

D.Schwen^{1,*} and R. S. Averback

¹Department of Materials Science and Engineering, University of Illinois @ Urbana-Champaign, 1304 W. Green St., Urbana, IL 61801, USA

S20-11

IN-SITU SURFACE AND INTERFACE CHARACTERIZATION OF NANOSTRUCTURES IN MATERIALS EXPOSED TO PARTICLE RADIATION FIELDS

J.P. Allain¹, O. El-Atwani¹, D.L. Rokusek¹, B. Holybee¹, M. Nieto-Perez²

¹Purdue University, West Lafayette, IN 47907, allain@purdue.edu

²CICATA-IPN, Cerro Blanco 141 Cimatario, Queretaro, QRO 76090 Mexico

**THURSDAY AUGUST 20
ROOM COZUMEL**

MORNING SESSION

S20-17 9:00-9:30 INVITED TALK

NANOSCALE SELF-ORGANIZATION IN ION IRRADIATED METAL ALLOYS: A NEW SCHEME FOR RADIATION RESISTANT MATERIALS

Robert S. Averback, B. Stumphy, N. Vo, and P. Bellon

Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign, 1304 W. Green St., Urbana IL. 61801:

Averback@illinois.edu

S20-18 9:30-10:00 INVITED TALK

SELF-ORGANIZED PATTERN FORMATION ON SEMICONDUCTOR SURFACES BY ION BEAM EROSION

F. Frost¹, B. Ziberi¹, B. Rauschenbach^{1,2}

¹Leibniz-Institut für Oberflächenmodifizierung, Permoserstr. 15, D-04318 Leipzig, Germany, E-mail: bernd.rauschenbach@iom-leipzig.de

²Universität Leipzig, Institut für Experimentelle Physik II, Angewandte Physik, Linnéstr. 5, D-04103 Leipzig, Germany, E-mail: brausch@rz.uni-leipzig.de

S20-19 10:00-10:30 INVITED TALK

THE INFLUENCE OF SURFACTANT ATOMS ON SURFACE PATTERN FORMATION DURING ION BEAM EROSION

H. Hofsaess and K. Zhang

^{2nd} Institute of Physics, University of Göttingen, Friedrich-Hund-Platz 1, 37077 Göttingen, Germany. E-mail: hans.hofsaess@phys.uni-goettingen.de

S20-20 10:30-11:00 INVITED TALK

DESIGNING SOFT-MAGNETIC MATERIALS BY ION IRRADIATION

J. McCord¹, J. Fassbender²

¹Institute for Magnetic Materials, IFW Dresden, Helmholtzstr. 20, 01069 Dresden, Germany. ²Institute of Ion Beam Physics and Materials Research, Forschungszentrum Dresden-Rossendorf, P.O. Box 510119, D-01314 Dresden, Germany. E-mail: j.mccord@ifw-dresden.de

S20-21 12:30-12:45

ION BEAM INDUCED NANOCCLUSERS AND ITS PERSPECTIVES

S. Dhara and Baldev Raj

Materials Science Group, Indira Gandhi Centre for Atomic Research, Kalpakam-603 102, India

S20-22 12:45-13:00

PHOTOACOUSTICS AND SEM STUDIES ON SHAPE DEFORMATION IN MeV Si ION-IRRADIATED SILICA PARTICLES

Juan-Carlos Cheang-Wong¹, Ulises Morales Muñoz¹, Rosalba Castañeda-Guzmán²

¹Instituto de Física, Universidad Nacional Autónoma de México, A.P. 20-364, México D.F. 01000, Mexico, ²Centro de Ciencias Aplicadas y Desarrollo Tecnológico (CCADET), Universidad Nacional Autónoma de México, Cd. Universitaria, México, D.F. 04510, Mexico, cheang@fisica.unam.mx

S20-23 13:00-13:15

NANOSECOND LASER IRRADIATION OF METALLIC NANO-CLUSTERS EMBEDDED IN SiO₂

A. Crespo-Sosa¹, P. SchAAF², A. Reyes¹, A. Olivier¹

¹Instituto de Física, Universidad Nacional Autónoma de México, AP 20-364, México DF 01000, México. ²Institute of Materials Engineering, Technische Universität Ilmenau, P.O.B. 10 05 65, 98684 Ilmenau, Germany

S20-24 13:15-13:30

ENHANCEMENT OF PHOTOLUMINESCENCE OF Si QUANTUM DOTS VIA COUPLING TO LOCALIZED SURFACE PLASMON OF Ag NANO-PARTICLES

A. López-Suárez, A. Benami, J. A. Reyes-Esqueda, L. Rodríguez-Fernández, J. C. Cheang-Wong, A. Crespo-Sosa, A. Oliver



Instituto de Física, Universidad Nacional Autónoma de México, México, D. F.
04510, México. E-mail: chipi@fisica.unam.mx

S20-25 13:30-13:45

**RECENT ADVANCES IN SYNCHROTRON RADIATION INVESTIGATION
OF FERROIC MATERIALS**

L. Fuentes-Cobas¹, M. E. Montero-Cabrera¹, L. Fuentes-Montero¹, M. E.
Fuentes-Montero²

¹Centro de Investigación en Materiales Avanzados, M. Cervantes 120, 31109
Chihuahua, México. ²Universidad Autónoma de Chihuahua, Chihuahua,
Mexico, Email: luis.fuentes@cimav.edu.mx

S20-26 13:45-14:00

**SYNCHROTRON RADIATION CHARACTERIZATION OF URANIUM
MINERALS FROM CHIHUAHUA**

D. C. Burciaga-Valencia¹, M. Reyes-Cortés^{1,3}, A. Reyes-Rojas¹, M. Rentería-
Villalobos¹, H. Esparza-Ponce¹, L. Fuentes-Cobas¹, L. Fuentes-Montero¹, M.
Silva-Sáenz¹, E. Herrera-Peraza¹, M. E. Montero-Cabrera¹*

¹Centro de Investigación en Materiales Avanzados, S.C., Miguel de Cervantes
120, Complejo Industrial Chihuahua, CP 31109, Chihuahua, Mexico. ²Facul-
tad de Ingeniería, Universidad Autónoma de Chihuahua, Campus Nuevo,
Chihuahua, Mexico. *E-mail: elena.montero@cimav.edu.mx