



E-MRS Spring Meeting 2001
June 5 - 8, 2001

SYMPOSIUM H

GaN and Related Compounds

Symposium Organizers:

H. Amano, Meijo University, Japan

E. Calleja, ETSI Telecommunication, Madrid, Spain

J. Christen, University of Magdeburg, Germany

M. Kamp, Global Light Industries GmbH, Germany

P. Lefebvre, University of Montpellier, France

J. Speck, University of California, USA

T. Suski, High Pressure Research, Poland

Papers will be published in
Materials Science & Engineering B

E-MRS 2001 SPRING MEETING

SYMPOSIUM H

Tuesday, June 5, 2001
Mardi 5 juin 2001

Morning
Matin

Session I: Characterization I

H-I.1 09:00 -Invited- OPTICAL CHARACTERISATION OF III-NITRIDES, **Bo Monemar**, Department of Physics and Measurement Technology, Linköping University, S-581 83 Linköping, Sweden

H-I.2 09:35 -Invited- CHARACTERIZATION OF NITRIDES BY ODMR/EPR, **E.R. Glaser**, Naval Research Laboratory, Washington, DC 20375-5347, USA

10:10 **BREAK**

Session II: Characterization II

H-II.1 10:40 TOWARDS AN UNDERSTANDING OF MOSAICITY AND STRAIN OF GaN EPITAXIAL LAYERS, **R. Chierchia**, T. Böttcher, L. Kahrs, H. Heinke, S. Einfeldt and D. Hommel, University of Bremen, Kufsteiner Strasse, 28359 Bremen, Germany

H-II.2 11:05 A COMPARATIVE STUDY OF In FLUCTUATION IN MBE AND MOCVD InGaN QWs, **P. Ruterana**, S. Kret, P. Vennéguès(1), B. Damilano(1), N. Grandjean(1), J. Massies(1), P. Gibart(1), M.A. Poisson(2) and G. Nouet, ESCTM-CRISMAT, 6 Bd Maréchal Juin, 14050 Caen Cedex, France, (1)CRHEA - CNRS, 1, rue Bernard Grégory, Sophia-Antipolis, Valbonne 06560, France, (2)LCRThomson CSF, Domaine de Corbeville, Orsay, France

H-II.3 11:30 SPATIAL VARIATION OF LUMINESCENCE OF InGaN ALLOYS MEASURED BY HIGHLY-SPATIALLY-RESOLVED SCANNING CATHODO-LUMINESCENCE, **F. Bertram**, S. Srinivasan, R. Liu, L. Geng and F.A. Ponce, Department of Physics, Arizona State University, Tempe AZ 85287-1504, USA, T. Riemann, J. Christen, University of Magdeburg, Experimentelle Physik, Uniplatz. 2, 39106 Magdeburg, Germany, S. Tanaka, H. Omiya, and Y. Nakagawa, Nichia Corporation, Tokushima-ken 774-8601, Japan

H-II.4 11:55 INDIUM-EDGE EXTENDED X-RAY ABSORPTION FINE STRUCTURE (EXAFS) OF InGaN CAN BE DETECTED BY OPTICAL FLUORESCENCE, J.F.W. Mosselmans, CLRC Daresbury Laboratoires, Warrington WA4 4AD, UK, R.W. Martin, **K.P. O'Donnell**, S. Pereira and M.E. White, Department of Physics, University of Strathclyde, Glasgow G4 0NG, UK

12:20 **LUNCH**

Tuesday, June 5, 2001
Mardi 5 juin 2001

Afternoon
Après-Midi

Session III: Polarization Issues

- H-III.1** 14:00 -Invited- POLARIZATION NON-LINEARITY IN III-V NITRIDE ALLOYS AND NANOSTRUCTURES, **V. Fiorentini and F. Bernardini**, Istituto Nazionale per la Fisica della Materia and Dipartimento di Fisica, Università di Cagliari, Cagliari, Italy
- H-III.2** 14:35 -Invited- POLAR SURFACES AND POLARIZATION INDUCED EFFECTS IN NITRIDES, **O. Ambacher**, Technical University of Munich, Germany
- H-III.3** 15:10 INVESTIGATION OF SURFACE POLARITY IN GaN USING HOT WET ETCHING TOGETHER WITH MICROSCOPY AND DIFFRACTION TECHNIQUES, **P. Visconti***, D. Huang, K.M. Jones, M.A. Reshchikov, F. Yun, A.A. Baski, T. King, H. Morkoç, Virginia Commonwealth University, Dept. of Electrical Engineering and Physics Department, Richmond VA 23284, USA, *Also with: Istituto per lo Studio di Nuovi Materiali per l'Elettronica, CNR, 73100 Lecce, Italy, J. Jasinski, W. Swider, and Z. Liliental-Weber, Lawrence Berkeley National Laboratory, Berkeley CA 94720, USA
- H-III.4** 15:35 -Invited- QD LASERS AND VCELS, **Y. Arakawa**, Uni. of Tokyo, Japan
- 16:10 **BREAK**

Session IV: Growth I

- H-IV.1** 16:40 STRUCTURAL EVOLUTION OF GaN NUCLEI ON SAPPHIRE STEPS, C.C. Kim and J.H. Je, Synchrotron X-ray Laboratory (SXL), Department of Materials Science and Engineering, Pohang University of Science and Engineering, Pohang, Korea, M.S. Yi and D.Y. Noh, Department of Materials Science and Engineering and Center for Electronic Materials Research, Kwangju Institute of Science and Technology, Kwangju, Korea, F. Degave and P. Ruterana, Equipe Structure et Comportement Thermomécanique des Matériaux (CRISMAT UMR 6508 CNRS), ISMRA 6, Bd Marechal Juin, 14050 Caen Cedex, France
- H-IV.2** 17:05 HETEROEPITAXIAL LATERAL OVERGROWTH OF $Al_xGa_{1-x}N$ ON PERIODICALLY GROOVED SUBSTRATES, S. Sano(1), T. Detchprohm(3), M. Yano(1), R. Nakamura(1), S. Mochizuki(1), H. Amano(2) and I. Akasaki(2), (1)Department of Electrical and Electric Engineering, Meijo University, (2)Department of Materials Science and Engineering, Meijo University, (3)High-tech Research Center, Meijo University, 1-501 Shiogamaguchi, Tenpaku-ku, Nagoya 468-8502, Japan
- H-IV.3** 17:30 INFLUENCE OF SELECTIVE GaN ISLANDS ON OPTICAL PROPERTIES OF GaN FILMS GROWN ON SAPPHIRE SUBSTRATE, S. Haffouz, P.R. Hageman, V. Kirilyuk, L. Macht, J.L. Weyher and P.K. Larsen, Exp. Solid Physics III, Research Institute for Materials, University of Nijmegen, Toernooiveld 1, 6525 ED Nijmegen, The Netherlands
- 17:55 Poster Session

Poster Session I

- H/PI.01** STUDY OF THE INFLUENCE OF DOPING ON RAMAN LINE SHAPES AND IMPURITY MODES IN GROUP III-NITRIDES, D.N. Talwar, P. HEINZ and M. Marconi, Department of Physics, Indiana University of Pennsylvania, Indiana PA 15705-1087, USA
- H/PI.02** BERYLLIUM IMPLANTATION OF Mg-DOPED MOVPE p-GaN, M.J. Legodj, F.D. Auret, S.A. Goodman, Physics Department, University of Pretoria, 0002 Pretoria, South Africa, B. Beaumont and P. Gibart, CRHEA-CNRS Valbonne, France
- H/PI.03** MICROSTRUCTURE AND ELECTRICAL PROPERTIES OF AlN THIN FILMS PREPARED BY REACTIVE ION BEAM COATING, Z.R. Song(a), Y.H. Yu(a,b), L.L. Cheng(a), B. Sundaravel(b), E.Z. Luo(b), S. Lin(b), Y.M. Lei(a), C.X. Ren(a), W.Y. Cheung(b), S.P. Wong(b), J.B. Xu(b), and I.H. Wilson(b), (a)Ion Beam Laboratory, Shanghai Institute of Metallurgy, Chinese Academy of Sciences, Shanghai, China, (b)Department of Electronic Engineering, Chinese University of Hong Kong, Hong Kong, China
- H/PI.04** MORPHOLOGICAL STUDY OF GaN EPITAXIAL LAYERS ON POROUS SILICON, A. Missaoui, H. Ezzaouia, B. Bessaïs, Laboratoire des Applications Solaires, Institut National de Recherche Scientifique et Technique, B.P. 95, 2050 Hammam-Lif, Tunisia and T. Boufaden, B. El Jani, Laboratoire de Physique des Matériaux, Faculté des Sciences de Monastir, Monastir 5000, Tunisia
- H/PI.05** SYNTHESIS OF GaN USING GAS-SOLID REACTIONS AS PRECURSORS, B.C. Dilelo, F.J. Moura and I.G. Solorzano, Department of Materials Science and Metallurgy, DCMM, PUC-Rio, Rio de Janeiro, Brazil
- H/PI.06** DEPENDENCE OF OPTICAL PROPERTIES ON CRYSTAL ORIENTATION IN InGaN/GaN QUANTUM WELL STRUCTURE, C.C. Chen, K.L. Hsieh, J.K. Sheu, C.C. Lee, G.C. Chi, C.H. Lee, K.L. Yu, M.Z. Lin, C.A. Chang, National Central University, Dept of Physics, 320 Chung-Li, Taiwan
- H/PI.07** MASS PRODUCTION MOCVD REACTOR FOR THE GROWTH OF BLUE LASER STRUCTURES, B. Schineller, H. Protzmann, M. Luenenbuerger, M. Heuken, AIXTRON AG, Kackertstr. 15-17, 52072 Aachen, Germany and E.V. Lutsenko, G.P. Yablonskii, Stepanov Institute of Physics, National Academy of Sciences of Belarus, F. Skaryna Ave. 68, 220072 Minsk, Belarus
- H/PI.08** INFLUENCE OF SUBSTRATE ON THE PHOTOLUMINESCENCE DYNAMICS IN InGaN EPILAYERS, K.P. Korona(1,2), J. Kuhl(2), P. Prystawko(3), M. Leszczynski(3), P. Perlin(3), T. Suski(3), (1)Institute of Experimental Physics, Warsaw University, Hoza 69, 00-681 Warszawa, Poland, (2)Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, 70569 Stuttgart, Germany, (3)High Pressure Research Center, Polish Academy of Sciences, Sokolowska 29/37, 01-142 Warszawa, Poland
- H/PI.09** ANALYSIS OF THE NUCLEATION OF GaN LAYERS ON (0001) SAPPHIRE, F. Degave, P. Ruterana, G. Nouet, J.H. Je* and C.C. Kim*, ESCTM-CRISMAT, Institut des Sciences de la Matière et du Rayonnement, 6 Bd Maréchal Juin, 14050 Caen Cedex, France, *Department of Materials Science and Engineering, Pohang University of Science and Engineering, Pohang, Korea
- H/PI.10** ETCH CHARACTERISTICS OF SAPPHIRE USING MAGNETIZED INDUCTIVELY COUPLED PLASMAS, C.H. Jeong, Y.J. Sung, and G.Y. Yeom, Dept. of Materials Engineering, Sungkyunkwan University, Suwon 440-746, Korea, J.S. Kwak, and Y.J. Park, Compound Semiconductor Lab., Samsung Advanced Institute of Technology, Suwon 440-600, Korea

- H/PI.11** BRILLOUIN CHARACTERIZATION OF THE ACOUSTIC-WAVES PHASE-VELOCITY IN $\text{Al}_x\text{Ga}_{1-x}\text{N}$ EPILAYERS, J. Rubio-Zuazo(a), R.J. Jimenez-Rioboo(a), C. Prieto(a), T. Palacios(b), F. Calle(b), E. Monroy(b), M.A. Sanchez-Garcia(b), (a)Instituto de Ciencia de Materiales de Madrid, CSIC, Cantoblanco, 28049 Madrid, Spain, (b)Instituto de Sistemas Optoelectronicos y Microtecnologia and Dpto. de Ingenieria Electronica, ETSI Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain
- H/PI.12** CORRELATION BETWEEN PHOTOLUMINESCENCE AND In-CONCENTRATION IN $\text{In}_x\text{Ga}_{1-x}\text{N}/\text{GaN}$ -QUANTUM-WELL-STRUCTURES, E. Hahn, D. Gerthsen, Laboratorium fürElektronenmikroskopie, Universität Karlsruhe, 76128 Karlsruhe, Germany, T. Stephan, H. Kalt, Institut für Angewandte Physik, Universität Karlsruhe, 76128 Karlsruhe, Germany, O. Schön, M. Heuken, AIXTRON AG, Kackertstr. 15, 52072 Aachen, Germany
- H/PI.13** ION BEAM AND PHOTOLUMINESCENCE STUDIES OF RARE EARTH IMPLANTED GaN FILMS, K. Lorenz(1), R.Vianden(1), E.Alves(2), M.F.da Silva(2), J.C.Soares(2), R. Correia(3), M. J. Soares(3), T. Monteiro(3), (1)ISKP, Univ. Bonn, Nussallee 14-16, 53115 Bonn, Germany, (2)Instituto Tecnológico e Nuclear, EN10, 2686-953 Sacavem, Portugal, (3)Departamento de Fisica, Universidade de Aveiro, 3810 Aveiro, Portugal
- H/PI.14** IN-PLANE GaN/AlGaN HETEROSTRUCTURE FABRICATED BY MASS TRANSPORT PLANAR TECHNOLOGY, S. Nitta, Y. Yukawa, M. Kosaki, M. Iwaya, S. Yamaguchi, H. Amano and I. Akasaki, Department of Electrical and Electronic Engineering, Department of Materials Science and Engineering, High-Tech Research Center, Meijo University, Japan
- H/PI.15** OHMIC CONTACT FORMATION TO n-GaN FABRICATED BY LASER LIFT-OFF, H.S. Kim, Y. Cho(1), C.H. Jeoung(2), D.H. Lee(2), I.M. Watson, T. Sands(1), and M.D. Dawson and G.Y. Yeom(2), Institute of Photonics, University of Strathclyde, Glasgow G4 0NW, UK, (1)University of California, Berkeley Ca 94720, USA, (2)Department of Materials Engineering, Sungkyunkwan University, Suwon 440-746, Korea
- H/PI.16** THE PROPERTIES OF THE FREE-STANDING CRYSTALS GaN, PREPARED BY CLORIDE-HYDRIDE EPITAXION, M. Mezdrogina, S.D. Raevsky, A.P. Skvortsov, V.V. Krivolapchuk, Sh.A. Yusupova, A.F.Ioffe Physicotechnical Institute RAS, 194021 26, Polytechnical str., St.-Petersburg, Russia
- H/PI.17** NANOTECHNOLOGY FOR SAW DEVICES ON AlN EPILAYERS, T. Palacios, F. Calle and E. Monroy, Instituto de Sistemas Optoelectronicos y Microtecnologia and Dpto. de Ingenieria Electronica, ETSI Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria s/n, 28040 Madrid, Spain, J. Grajal. Dpto. de Senales, Sistemas y Radiocomunicaciones, ETSI Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria s/n, 28040 Madrid, Spain, C. Prieto. Instituto de Ciencia de Materiales, CSIC, Cantoblanco, 28049 Madrid, Spain
- H/PI.18** SPATIALLY RESOLVED ELECTROLUMINESCENCE (EL) INVESTIGATION ON InGaN MULTIQUANTUM WELL LEDs, R. Xia, I. Harrison, E. C. Larkins, A. Andrianov(1), S. R. A. Dods(2) and J. M. Morgan(3), School of Electrical and Electronic Engineering, University of Nottingham, University Park, NG7 2RD, UK, P. J. Parbrook, C. C. Button, and G. Hill, Department of Electronic and Electrical Engineering, University of Sheffield, Mappin Street, Sheffield, S1 3JD, UK, Current address: (1)A. F. Ioffe Institute, St. Petersburg, Russia, (2)Optiwave Corporation, 16 Concourse Gate, Suite 100, Nepean, Ontario, K2E 7S8, Canada, (3)Domino UK Limited, Bar Hill Cambridge CB3 8TU, UK
- H/PI.19** ON THREADING DISLOCATION SCATTERING IN GaN FILMS, L.B. Hovakimian, Institute of Radiophysics and Electronics, Armenian Academy of Sciences, Ashtarak-2, 378410 Armenia
- H/PI.20** ELECTRICAL CHARACTERISATION AND MICROSTRUCTURE OF TiN OHMIC CONTACTS ON GALLIUM NITRIDE, S. Gautier, Th. Kehagias, P. Patsalas, S. Logothetidis, C.A. Dimitriadis, and Ph. Komninou, Department of Physics, Aristotle University of Thessaloniki, 54005, Thessaloniki, Greece, G. Nouet, ESCTM-CRISMAT, UMR6508-CNRS, ISMRA, 6 Boul. du Marechal Juin, 14050 Caen Cedex, France

- H/PI.21** Si AT (0001) GaN SURFACES, A.L. Rosa and J. Neugebauer, Fritz-Haber-Institut der Max-Planck-Gesellschaft, Faradayweg 4-6, 14195 Berlin, Germany, J.E. Northrup, Xerox Parc, 3333 Coyote Hill Road, Palo Alto 94304, USA, C.D. Lee and R.M. Feenstra, Department of Physics, Carnegie Mellon University, Pittsburgh 5213, USA
- H/PI.22** XPS STUDY OF NITRIDATION OF InP(100), GaAs(100) AND FIRST STEPS OF GROWTH OF GaN ON GaAs(100), Y. Ould-Metidji, L. Bideux, V. Matolin*, B. Gruzza, C. Robert, LASMEA, UMR UBP/CNRS 6602, Blaise Pascal University, 24 Avenue des Landais, 63177 Aubiere, France, *Department of Electronics and Vacuum Physics, Charles University, V Holesovickach 2, 180 00 Prague 8, Czech Republic
- H/PI.23** HIGH TEMPERATURE OPTICAL CONSTANTS OF HEXAGONAL GaN USING IN-SITU SPECTRAL REFLECTOMETRY DURING MOVPE, R.S. Balmer, C. Pickering, T. Martin, DERA Malvern, Worcs, WR14 3PS, UK
- H/PI.24** MECHANISM OF OHMIC FORMATION OF Ti/Al CONTACT ON (NH₄)₂S_x-TREATED n-TYPE GaN, Ching-Ting Lee and Yow-Jon Lin, Institute of Optical Sciences, National Central University, Chung-Li, Taiwan
- H/PI.25** INVESTIGATIONS OF PHONON SIDEBANDS IN InGaN/GaN MULTI-QUANTUM WELL LUMINESCENCE, R. Pecharrroman-Gallego(a), P.R. Edwards(a), R.W. Martin(a), I.M. Watson(b), (a)Department of Physics, Universtiy of Strathclyde, Glasgow G40NG, UK, (b)Institute of Photonics, Universtiy of Strathclyde, Glasgow G40NG, UK
- H/PI.26** CANCELLED
- H/PI.27** PHOTOLUMINESCENCE EXCITATION SPECTRA OF InGaN, C. Deatcher, K. Esona, R.W. Martin, K.P. O'Donnell, S. Pereira and M.E. White, Department of Physics, Universtiy of Strathclyde, Glasgow G4 0NG, UK
- H/PI.28** ELECTRICAL CHARACTERIZATION OF DEEP DEFECT STATES IN GALLIUM NITRIDE CO-IMPLANTED WITH MAGNESIUM AND SULFUR IONS, A. Krtschil, A. Kielburg, H. Witte, A. Krost, J. Christen, Institute of Experimental Physics, Otto-von-Guericke-University of Magdeburg, PO Box 4120, 39016 Magdeburg, Germany, A. Wenzel, Institute of Physics, University of Augsburg, 86135 Augsburg, Germany, and B. Rauschenbach, Institute of Surface Modification Leipzig and Institute of Experimental Physics II, University of Leipzig, 04318 Leipzig, Germany
- H/PI.29** TIGHT BINDING MODELING OF BAND OFFSETS AND SCHOTTKY BARRIERS III-NITRIDE BASED HETEROSTRUCTURES, H. Hunlü, Department of Physics, Istanbul Technical University, Turkey
- H/PI.30** GaN, InGaAs AND AlGaAs EPITAXIAL FILMS ON FIANITE AND LiNbO₃ SUBSTRATES, A.N. Buzynin, V.V. Osiko, E.E. Lomonova, Yu.K. Voron'ko, General Physics Institute, Russian Academy of Sciences, Moscow, Russia, Yu.N. Buzynin, V.M. Daniltsev, O.I. Khrykin, Institute for Physics of Microstructure, Russian Academy of Sciences, Nizhny Novgorod, Russia, V.M. Garmash, Science Research Institute "Polys", Moscow, Russia, Z.Y. Sadygov, Joint Institute for Nuclear Research, Dubna, Russia

Wednesday, June 6, 2001
Mercredi 6 juin 2001

Afternoon
Après-Midi

Session V: Quantum Dots

H-V.1 14:00 -Invited- InGaN/GaN LIGHT EMITTING DIODES GROWN BY MOLECULAR BEAM EPITAXY, **B. Damilano**, N. Grandjean, F. Semond, F. Natali and J. Massies, Centre National de la Recherche Scientifique, Centre de Recherche sur l'Hétéro-Epitaxie et ses Applications, Rue B. Grégory, 06560 Sophia Antipolis, France, C. Pernot, Picogiga., Place Marcel Rebuffat, 91971 Courtaboeuf 7 Cedex, France

H-V.2 14:35 -Invited- GROWTH AND COMPARATIVE OPTICAL PROPERTIES OF HEXAGONAL AND CUBIC GaN QUANTUM DOTS, J. Simon, E. Martinez-Guerrero, C. Adelman, Guido Mula, B. Daudin, H. Mariette, CEA/Grenoble, DRFMC, 38054 Grenoble, France, and N.T. Pelekanos, FORTH, Microelectronics Group, PO Box 1527, 71110 Heraklion, Greece

H-V.3 15:10 ATOMIC AND ELECTRONIC STRUCTURES OF $\text{In}_x\text{Ga}_{1-x}\text{N}$ QUANTUM DOTS, J.L.A. Alves, C. de Oliveira, R. de Paiva, H.W. Leite Alves, DCNAT-FUNREI, CP 110, 36.300-000 Sao Joao del Rei, MG, Brazil, and J.R. Leite, DFMM-IFUSP, CP 66318, 05389-970 Sao Paulo, SP, Brazil

H-V.4 15:35 LARGE SIZE-DEPENDENCE OF EXCITON-LO-PHONON COUPLING IN NITRIDE-BASED QUANTUM WELLS AND QUANTUM BOXES, S. Kalliakos, X.-B. Zhang, T. Taliercio, P. Lefebvre and B. Gil, Groupe d'Etude des Semiconducteurs, CNRS, Université Montpellier II, Case courrier 074, 34095 Montpellier Cedex 5, France, N. Grandjean, B. Damilano and J. Massies, Centre de Recherche sur l'Hétéro-Epitaxie et ses Applications, CNRS, Rue Bernard Grégory, 06560 Valbonne, France

16:00 **BREAK**

Session VI: LEDs & LDs

H-VI.1 16:30 -Invited- GaN-BASED LIGHT EMITTERS ON SILICON, **A. Krost**, Uni. of Magdeburg, Germany

H-VI.2 17:05 -Invited- CW InGaN MULTIPLE-QW LASER DIODES ON COPPER AND DIAMOND SUBSTRATES OBTAINED BY LASER LIFT-OFF, **M. Kneissl**, Xerox, Palo-Alto, USA

H-VI.3 17:40 ELECTROLUMINESCENT PROPERTIES OF GaN/InGaN AND AlGaIn/GaN/InGaN QUANTUM WELL LIGHT EMITTING TEST STRUCTURES STUDIED DURING EXTENDED OPERATION, A. Crawford and D. Lancefield, Department of Physics, University of Surrey, Guildford, Surrey, GU2 7XH, UK

H-VI.4 18:05 GaN MICROCAVITIES FORMED BY LASER LIFT-OFF AND PLASMA ETCHING, R.W. Martin(a), H.S. Kim(b), Y. Cho(c), P.R. Edwards(a), I.M. Watson(b), T. Sands(c), N.Y. Cheung(c), M.D. Dawson(b), (a)Department of Physics, Universtiy of Strathclyde, Glasgow G40NG, UK, (b)Institute of Photonics, Universtiy of Strathclyde, Glasgow G40NG, UK, (c)University of California, Berkeley CA 94720, USA

Thursday, June 7, 2001
Jeudi 7 juin 2001

Morning
Matin

Session VII: New Materials

H-VII.1 08 :30 -Invited- LOCALIZATION EFFECTS IN GaInNAs MULTI-QUANTUM WELL STRUCTURES, **A. Hoffmann**, A. Kaschner, T. Lüttger, H. Born, R. Heitz, Institut für Festkörperphysik, Technical University Berlin, Germany. A. Y. Egorov, H. Riechert, Infineon Technologies, Munich, Germany.

H-VII.2 09 :05 STRONG BLUE EMISSION FROM GaN ISOELECTRONICALLY DOPED WITH ARSENIC, **C.T. Foxon**, S.V. Novikov, T. Li, R.P. Campion, C.S. Davis, A.J. Winsor and I. Harrison, University of Nottingham, Nottingham NG7 2RD, UK and Y. Liao, University of Science and Technology of China, Hefei 230026, China

H-VII.3 09 :30 AES-ANALYSIS OF THE SB INCORPORATION INTO GaN MBE-LAYERS, **D.G. Ebling**(1), P. Cristea(1), K.W. Benz(1), Ch. Haug(1,2), R. Brenn(1,2), S. Novikov(3), C.T. Foxon(3) (1)Freiburg Materials Research Center, University of Freiburg, Stefan-Meier-Str. 21, 79104 Freiburg, Germany, (2) Faculty of Physics, University of Freiburg, Hermann-Herder-Str., 79104 Freiburg, Germany, (3)Department of Physics, University of Nottingham, University Park, Nottingham, UK

09:55

BREAK

H-VIII.1 10:20 -Invited- ALTERNATE DOPANTS AND DOPING APPROACHES FOR GaN GROWN BY RF PLASMA MBE, **T. Myers**, Uni. West Virginia, USA

H-VIII.2 10:55 -Invited- THE ROLE OF Ga VACANCY IN GROWTH AND DOPING OF GaN, **P. Hautojarvi**, Helsinki Uni of Technology, Finland

H-VIII.3 11:30 ABOUT STRUCTURAL DEFECTS INDUCED BY Mg DOPING OF GaN AND THEIR INFLUENCES ON THE PHYSICAL PROPERTIES OF THE MATERIALS, **P. Vennéguès**, M. Benaissa, S. Dalmasso, E. Feltin, M. Leroux, P. De Mierry, B. Beaumont, B. Damilano, N. Grandjean, Centre de Recherche sur l'Hétéro-Epitaxie et ses Applications, Centre National de la Recherche Scientifique, Rue Bernard Grégory, Sophia Antipolis, 06560 Valbonne, France

H-VIII.4 11:55 METASTABLE ELECTRON TRAPS CREATED IN n-TYPE GaN DURING 40 keV HYDROGEN IMPLANTATION, **E.D. Auret**, S.A. Goodman and G. Myburg, Department of Physics, University of Pretoria, Pretoria 0002, South Africa, B. Beaumont and P. Gibart, CRHEA-CNRS, Valbonne, France

12:20

LUNCH

Thursday, June 7, 2001
Jeudi 7 juin 2001

Afternoon
Après-Midi

Session IX: Growth II

H-IX.1 14 :00 -Invited- IDENTIFICATION OF GROWTH MECHANISMS ON CLEAN AND ADSORBATE COVERED GaN SURFACES, **J. Neugebauer**, Fritz-Haber-Inst. der Max-Planck Gesellschaft, Berlin, Germany

H-IX.2 14 :35 -Invited- GROWTH OF GROUP III NITRIDES ON NONPIEZOELECTRIC ORIENTATIONS, **O. Brandt**, Paul-Drude-Inst. Festkoerper-elektronik, Berlin, Germany

H-IX.3 15 :10 GAS-PHASE AND SURFACE PROCESSES LIMITING INDIUM INCORPORATION IN MOVPE OF InGaN, **E.V. Yakovlev**, R.A. Talalaev, Yu.A. Shpolyanskiy, S.Yu. Karpov, Soft Impact Ltd, St.Petersburg, Russia, Yu.N. Makarov, STR,Inc, Richmond VA, USA

H-IX.4 15 :35 EPITAXIAL GROWTH OF C-GAN ON SI(100) SUBSTRATES USING BP AS A BUFFER LAYER -SELECTIVE EPITAXIAL GROWTH, **S. Nishimura**, H. Hanamoto, *K. Terashima and S. Matsumoto, Faculty of Science and Technology, Keio University, 3-14-1 Hiyosi Kouhokuku Yokohama, 223-8522 Japan, *Shonan Institute of Technology, 1-1-25 Tsujido-nishikaigan, Fujisawa, 251-8511 Japan

16 :00 **BREAK**

Session X: Bulk & Homoepitaxy

H-X.1 16 :30 -Invited- PREPARATION OF LARGE GaN SUBSTRATES, **K. Motoki**, T. Okahisa, N. Matsumoto, H. Kimura, H. Kasai, K. Takemoto, K. Uematsu, S. Nakahata, M. Ueno, Y. Kumagai*, A. Koukitu* and H. Seki*, Itami Research Laboratories, Sumitomo Electric Industries Ltd., Japan, *Tokyo University of Agriculture and Technology, Japan

H-X.2 17 :05 -Invited- HOMOEPITAXY OF NITRIDES ON BULK GaN. FROM PHYSICS TO APPLICATIONS, **P. Perlin**, High Pressure Res. Center, Warsaw, Poland

17 :40 Poster Session

Poster Session II

- H/PII.01** INVESTIGATION ON GROWTH MODES OF GaN LAYERS GROWN BY LIRE, G. Henn, T. Rupp, H. Schröder, DLR, Institute of Technical Physics, Stuttgart, Germany
- H/PII.02** ELECTRIC-FIELD ENHANCED LOCALIZATION OF EXCITONS IN GaN/AlGa_N QUANTUM WELLS, M. Gallart, P. Lefebvre, T. Taliercio, B. Gil and H. Mathieu, Groupe d'Etude des Semiconducteurs - CNRS, Université Montpellier II, Case courrier 074, 34095 Montpellier Cedex 5, France, N. Grandjean, B. Damilano and J. Massies, Centre de Recherche sur l'Hétéro-Epitaxie et ses Applications – CNRS, Rue Bernard Grégory, 06560 Valbonne, France
- H/PII.03** DIRECT IMAGING OF MICRO-DOMAINS IN CRACK-FREE AlGa_N GROWN ON PATTERNED GaN/SAPPHIRE SUBSTRATES, T. Riemann, J. Christen, Otto-von-Guericke-University Magdeburg, PO Box 4120, 39016 Magdeburg, Germany; A. Kaschner, A. Hoffmann, C. Thomsen, TU Berlin, Hardenbergstr. 36, 10623 Berlin, Germany; M. Iwaya, H. Amano, I. Akasaki, Meijo University, Nagoya, Japan
- H/PII.04** MICROSCOPIC OPTICAL PROPERTIES OF HIGH QUALITY INGAN MQWS GROWN ON PATTERNED GaN/LT-AlN/SAPPHIRE SUBSTRATES, T. Riemann, J. Christen, Otto-von-Guericke-University Magdeburg, PO Box 4120, 39016 Magdeburg, Germany; A. Kaschner, A. Hoffmann, C. Thomsen, TU Berlin, Hardenbergstr. 36, 10623 Berlin, Germany; M. Iwaya, H. Amano, I. Akasaki, Meijo University, Nagoya, Japan
- H/PII.05** CURRENT-VOLTAGE CHARACTERISTICS OF TITANIUM AND INDIUM CONTACTS TO p-TYPE GaN, B. Santic and A. Dörnen, (1)Ruder Boskovic Institute, Bijenicka 54, P.O. Box 1016, 10000 Zagreb, Croatia, (2)4. Physikalisches Institut, Universität Stuttgart, Pfaffenwaldring 57, 70550 Stuttgart, Germany
- H/PII.06** ELECTRICAL PROPERTIES OF GaN SINGLE CRYSTALS DOPED WITH Mg AND Be, E. Litwin-Staszewska, R. Piotrkowski, L. Dmowski, I. Grzegory, M. Bockowski, T. Suski, UNIPRESS, Polish Academy of Sciences, 01-142 Warszawa, Poland, E. Kamiska, A. Piotrowska, Institute of Electron Technology, 02-668 Warszawa, Poland
- H/PII.07** CHARACTERIZATION OF III-NITRIDE OPTOELECTRONIC DEVICE HETERO-STRUCTURES USING INFRARED ELLIPSOMETRY, M. Schubert, and A. Kasic, Universität für Experimentelle Physik II, 04103, Leipzig, Germany, S. Einfeldt and D. Hommel, Institut für Festkörperphysik, Universität Bremen, 28359 Bremen, Germany, J. Off and F. Scholz, 4. Physikalisches Institut, Universität Stuttgart, 70569 Stuttgart, Germany
- H/PII.08** GROWTH OF AlGa_N/GaN HETEROSTRUCTURES ON SiC/Si(111) PSEUDOSUBSTRATES BY MOLECULAR BEAM EPITAXY, J. Ristic, M.A. Sanchez-Garcia, E. Calleja, ISOM and Departamento de Ingenieria Electronica, ETSI Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain, A. Perez-Rodriguez, C. Serre, A. Roman Rodriguez, A. Morante, EME- Electronic Materials and Engineering, Department of Electronics, Universidad de Barcelona, Marti i Franques 1, 08028 Barcelona, Spain
- H/PII.09** DEEP TRAP ANALYSIS OF GaN LAYERS IN THE ABRUPT TRANSITION BETWEEN SEMI-INSULATING AND N-TYPE CONDUCTIVE BEHAVIOUR, H. Witte, A. Krtschil, A. Kielburg, E. Schrenk, A. Krost, J. Christen, Institute of Experimental Physics, Otto-von-Guericke-University of Magdeburg, PO Box 4120, 39016 Magdeburg, Germany and B.Kuhn, F.Scholz, 4. Physikalisches Institut, Universität Stuttgart, Pfaffenwaldring 57, 70550 Stuttgart, Germany

- H/PII.10** THE ORIGIN OF INVERSION DOMAINS IN GaN GROWN BY MBE ON (111) Si, A.M. Sanchez, F.J. Pacheco, S.I. Molina and R. Garcia, Departamento de Ciencia de los Materiales e Ingenieria Metalurgica y Quimica Inorganica, Universidad de Cadiz, 11510 Puerto Real, Cadiz, Spain, P. Ruterana and G. Nouet ESCTM - CRISMAT UMR 6508 CNRS, Institut des Sciences de la Matière et du Rayonnement, 6 Boulevard du Marechal Juin, 14050 Caen Cedex, France, M.A. Sanchez-Garcia and E. Calleja, Departamento de Ingenieria Electronica, ETSI Telecomunicacion, UPM, Ciudad Universitaria s/n, 28040 Madrid, Spain
- H/PII.11** ELECTROOPTIC EFFECT IN GaN, S. Shokhovets, R. Goldhahn and G. Gobsch, Institut f. Physik, TU Ilmenau, PF 100565, 98684 Ilmenau, Germany
- H/PII.12** CRACK-FREE InGaN/GaN LIGHT EMITTERS ON Si(111) GROWN BY METALORGANIC CHEMICAL VAPOR PHASE DEPOSITION, A. Dadgar(1), A. Alam(2), T. Riemann(1), J. Bläsing(1), A. Diez(1), M. Heuken(2), J. Christen(1) and A. Krost(1), (1)Otto-von Guericke Universität Magdeburg, Institut für Experimentelle Physik, Fakultät für Naturwissenschaften, Postfach 4120, 39016 Magdeburg, Germany, (2)AIXTRON AG, Kackertstr. 15-17, 52072 Aachen, Germany
- H/PII.13** STRUCTURAL AND OPTICAL CHARACTERIZATION OF THICK InGaN LAYERS AND InGaN/GaN MQWS GROWN BY MOLECULAR BEAM EPITAXY, F.B. Naranjo, S. Fernandez, M.A. Sanchez-Garcia, F. Calle, E. Calleja, ISOM and Departamento de Ingenieria Electronica, ETSI Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain, A. Trampert, K.H. Ploog, Paul-Drude-Institut fuer Festkoerperelektronik, Hausvogteiplatz 5-7, 10117 Berlin, Germany
- H/PII.14** GROWTH AND CHARACTERIZATION OF HIGH QUALITY TEN-PERIOD AlGaIn/GaN BRAGG REFLECTORS GROWN BY MOLECULAR BEAM EPITAXY, S. Fernandez, F.B. Naranjo, F. Calle, E. Calleja, ISOM and Departamento de Ingenieria Electronica, ETSIT, Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain, A. Trampert, K.H. Ploog, Paul-Drude-Institut fuer Festkoerperelektronik, Hausvogteiplatz 5-7, 10117 Berlin, Germany
- H/PII.15** OPTICAL SPECTROSCOPY OF AlGaIn/GaN HFET STRUCTURES, J.L. Pau, A. Jimenez, E. Munoz, E. Calleja, Dpto. Ingenieria Electronica, ETSI Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain, B. Heying, C. Poblenz, C. Elsass and J. Speck Materials Department, University of California, Santa Barbara CA 93106, USA
- H/PII.16** RAMAN SCATTERING, PHOTOLUMINESCENCE AND X-RAY DIFFRACTION STUDIES OF GaN LAYERS GROWN ON MISORIENTED SAPPHIRE SUBSTRATES, M. Benyoucef and M. Kuball, H.H. Wills Physics Laboratory, University of Bristol, Bristol BS8 1TL, U.K., D.D. Koleske, A.E. Wickenden, R.L. Henry, M. Fatemi, and M.E. Twigg, Electronics Science and Technology Division, Code 6800, Naval Research Laboratory, Washington DC 20375, USA
- H/PII.17** ENERGY TRANSFER PROCESSES FROM MIXED AMORPHOUS-NANOCRYSTALLINE GaN and AlN HORSTS TO RARE-EARTH IONS, S.B. Aldabergenova, H.P. Strunk, Institut für Werkstoffwissenschaften, Universität Erlangen-Nürnberg, Cauerstr. 6, 91058, Erlangen, Germany, J. Viner, P.C. Taylor, University of Utah, Salt Lake City UT 84112, USA, A.A. Andreev, A.F.Ioffe Physical-Technical Institute, Polytechnicheskaya 26, 194021 St.Petersburg, Russia
- H/PII.18** CORRELATION BETWEEN TRANSPORT AND STRUCTURAL PROPERTIES IN AlGaIn/GaN HETEROSTRUCTURES, A. Jimenez, E. Calleja, E. Munoz, Dpto. Ingenieria Electronica, E.T.S.I. Telecomunicacion, Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain, F. Omnes, P. Gibart, CRHEA-CNRS, Rue Bernard Gregory, Parc Sophia Antipolis, 06560 Valbonne, France

- H/PII.19** GROWTH OF AlN FILMS BY PVD METHOD AT LOW TEMPERATURE: OPTICAL AND ELECTRICAL PROPERTIES, M.A. Djouadi(1, 2), V. Mortet(1), O. Elmazria(3), M. Remi(3) and P.Y. Jouan(4), (1)Ecole Nationale Supérieure d'Arts et Métiers, La.Bo.Ma.P., 71250 Cluny, France, (2)Institute of Applied Physics, EPFL, 1015 Lausanne, Switzerland, (3)LPMIA, Université de Nancy I, 54506 Vandœuvre les Nancy, France, (4)LAMAC, ZI du champ de l'Abesse, 59600 Maubeuge, France
- H/PII.20** INFLUENCE OF HIGH PRESSURE ON THE POLYTYPE STRUCTURE OF NANOCRYSTALLINE GaN, R. Pielaszek(a,b), S. Gierlotka(a), E. Grzanka(a,b), B. Palosz(a), S. Stelmakh(a), (a)High Pressure Research Center, Polish Academy of Sciences, Warsaw, Poland, (b)Warsaw University, Department of Physics, Warsaw, Poland
- H/PII.21** LAYER-BY-LAYER DEPOSITION OF GROUP-III NITRIDES BY TWO-STEP CYCLIC PROCESS, S. Koynov, P. Sanguino, M. Niehus, R. Schwarz, Departamento de Física, Instituto Superior Técnico, Lisbon, Portugal, R. Rocha, University of Aveiro, Aveiro, Portugal, H. Alves, B.K. Meyer, Justus-Liebig-University, Giessen, Germany
- H/PII.22** PLANAR FORCE-CONSTANT METHOD FOR THE LATTICE DYNAMICS OF CUBIC InN, H.W. Leite Alves, J.L. A. Alves, DCNAT-FUNREI, CP 110, 36.300-000 Sao Joao del Rei, MG, Brazil, L.M.R. Scolfaro and J.R. Leite, DFMM-IFUSP, CP 66318, 05389-970 Sao Paulo, SP, Brazil
- H/PII.23** THEORETICAL STUDY OF THE $Al_xGa_{1-x}N$ ALLOYS, J.L.A. Alves, C. de Oliveira, R. de Paiva, H.W. Leite Alves, DCNAT-FUNREI, CP 110, 36.300-000 Sao Joao del Rei, MG, Brazil, R.A. Nogueira, DF-ICEX, UFMG, CP 702, 30.161-970 Belo Horizonte, MG, Brazil and J.R. Leite, DFMM-IFUSP, CP 66318, 05389-970 Sao Paulo, SP, Brazil
- H/PII.24** ION BEAM SYNTHESIS OF GaN PRECIPITATES IN GaAs, S. Amine, G. Ben Assayag, C. Bonafos, B. de Mauduit and A. Claverie, CEMES/CNRS BP4347 31055 Toulouse Cedex, France
- H/PII.25** $Ga_{1-x}Mn_xN$ SINGLE CRYSTALS WITH THE C AXIS PARALLEL TO THE PREPARED PLATELETS, T. Szyszko(a), G. Warso(a), S. Podsiadlo(a), W. Gebicki(b), J. Gosk(c), M. Zajic(c), (a)Faculty of Chemistry, Warsaw University of Technology, Noakowskiego 3, 00 – 664 Warszawa, Poland, (b)Institute of Physics, Warsaw University of Technology, Koszykowa 75, 00 - 662 Warszawa, Poland, (c)Institute of Physics, Warsaw University, Hoka 69, 00 - 681 Warszawa, Poland
- H/PII.26** SPLITTING OF THE X-RAY DIFFRACTION PEAKS RELATED TO THE LIGHT EMISSION PROPERTIES IN InGaN/GaN LAYERS, S. Pereira(a,b), M.R. Correia(a), E. Pereira(a), K.P. O'Donnell(b), R.W. Martin(b), M. White(b), E. Alves(c), A.D. Sequeira(c) and N. Franco(c) I.M. Watson(d), (a)Departamento de Física, Universidade de Aveiro, 3810-193 Aveiro, Portugal, (b)Department of Physics, University of Strathclyde, Glasgow G4 0NG, Scotland, UK, (c)Departamento de Física do ITN, E.N. 10, 2686-953 Sacavem, Portugal, (d)Institute of Photonics, University of Strathclyde, G4ONW, Scotland, UK
- H/PII.27** PREPARATION AND PROPERTIES OF IRON AND MAGNESIUM DOPED SINGLE CRYSTALS OF GALLIUM NITRIDE, B. Strojek(a), S. Podsiadlo(a), W. Gebicki(b), L. Adamowicz(b), A. Twardowski(c), J. Gosk(c), (a)Faculty of Chemistry, Warsaw University of Technology, (b)Institute of Physics, Warsaw University of Technology, (c)Institute of Physics, Warsaw University, Poland
- H/PII.28** INVESTIGATION OF GaN QUANTUM DOT STACKING IN A MULTILAYER WITH X-RAY GRAZING INCIDENCE TECHNIQUES, V. Chamard, ESRF Grenoble France, T. Metzger, ESRF Grenoble France, E. Bellet-Almaric, CEA Grenoble, France, B. Daudin, CEA Grenoble, France, H. Mariette, CEA Grenoble, France

Friday, June 8, 2001
Vendredi 8 juin 2001

Morning
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Session XI: GaN/AlGa_N Heterostructures I

H-XI.1 08 :30 -Invited- PLASMA-ASSISTED MBE GROWTH OF GROUP-III NITRIDES: FROM BASICS TO DEVICE APPLICATIONS, **M.A. Sánchez-García**, J.L. Pau, F.Naranjo A. Jiménez, S. Fernández, J. Ristic, F. Calle, E. Calleja and E. Muñoz, UPM, Madrid, Spain

H-XI.2 09 :05 -Invited- GROUP III-NITRIDE-BASED SENSORS FOR COMBUSTION MONITORING, **J. Schalwig**, G. Müller, O. Ambacher, M. Stutzmann, EADS Deutschland GmbH, Munich, Germany

H-XI.3 09 :40 AlGa_N ULTRAVIOLET PHOTODETECTORS GROWN BY MOLECULAR BEAM EPITAXY ON Si (111) SUBSTRATES, **J.L. Pau**, E. Monroy, M.A. Sanchez-García, E. Calleja and E. Munoz, Dpto. Ingenieria Electronica, ETSI Telecomunicacion Universidad Politecnica de Madrid, Ciudad Universitaria, 28040 Madrid, Spain

10 :05 **BREAK**

Session XII: GaN/AlGa_N Heterostructures II

H-XII.1 10 :35 -Invited- POWER HEMTs, ELECTRONIC APPLICATIONS, **U. Mishra**, Uni. of California-Santa Barbara, USA

H-XII.2 11 :10 TRANSPORT AND NOISE PROPERTIES OF QUATERNARY HETEROSTRUCTURES GROWN ON 2-INCH 6H-SiC AND 4H-SiC WAFERS, **R. Gaska**(a) and M.S. Shur(a,b) J.W. Yang(c), A. Khan(c), G. Simin(c), M. Yoganathan(d), A. Gupta(d), J. Burton(d), J. Whitlock(d), John Glesener(d), T. Anderson(d), (a)Sensor Electronics Technology, 21 Cavalier Way, Latham NY 12110, USA, (b)Rensselaer Polytechnic Institute, (c)Department of Electrical Engineering, University of South Carolina, (d)Litton Airtron, 200 E Hanover Ave, Morris Plains NJ 07950, USA

H-XII.3 11 :35 FIRST AlGa_N/Ga_N MOSFET WITH PHOTOANODIC GATE DIELECTRIC, **D. Mistele**, T. Rotter, R. Ferretti, F. Fedler, H. Klausning, O.K. Semchinova, J. Stemmer, J. Aderhold, and J. Graul, Laboratory for Information Technology, University of Hannover, Schneiderberg 32, 30167 Hannover, Germany

H-XII.4 12 :00 OBSERVATION OF ION-INDUCED CHANGES IN THE CHANNEL CURRENT OF HIGH-ELECTRON-MOBILITY AlGa_N/Ga_N TRANSISTORS (HEMT), **R. Neuberger**, G. Müller, EADS Deutschland GmbH, O. Ambacher, M. Stutzmann, Walter Schottky Institut, TU Munich, Germany

12 :25 **LUNCH**