Conference on LED and Its Industrial Application '14

LEDIA '14

Tuesday, April 22

15:30-15:45 Opening Room 411, 412

Opening Remarks

15:30 H. Amano, Conference Chair of LEDIA' 14
Nagoya Univ., Japan

15:45-16:45 LED1: GaN Bulk Growth Room 411, 412

Chair: Y. Mori, Osaka Univ., Japan

LED1-1 15:45 **(Invited) Hydride Vapor Phase Epitaxy on Ammonothermally Grown GaN Seeds: Challenges and Perspectives**
M. Boćkowski [1,2)]
[1)] Institute of High Pressure Physics, PAS, Poland, [2)] Top GaN Sp. z o.o., Poland

LED1-2 16:15 **Growth of GaN Layers Using Ga_2O Vapor Synthesized from Ga Metal**
T. Sumi [1)], H. Takatsu [1)], M. Juta [1)], J. Y. Bu [1)], A. Kitamoto [1)], M. Imade [1)], M. Yoshimura [1)], M. Isemura [2)], and Y. Mori [1)]
[1)] Osaka Univ., Japan, [2)] Itochu Plastics Inc., Japan

LED1-3 16:30 **Controlling the Growth Habit of Early Stage in the Na-Flux Coalescence Growth by the Dipping Technique**
K. Nakamura, M. Imanishi, T. Sato, K. Murakami, H. Imabayashi, H. Takazawa, Y. Todoroki, D. Matsuo, M. Maruyama, M. Imade, M. Yoshimura, and Y. Mori
Osaka Univ., Japan

16:45-17:30 LED2 : Agricultural Applications
Room 411, 412

Chair: Y. Mori, Osaka Univ., Japan

LED2-1 16:45 **(Invited) Present Status of LED-Based Plant Factory in Japan**
M. Takatsuji
Foundation of Social Development Research Center, Japan

LED2-2 17:15 **Far-Red Cr-Doped Garnets for the Control of Photomorphogenesis in Plants Using Phosphor-Conversion LEDs**
A. Zabiliūtė, S. Butkutė, A. Žukauskas, P. Vitta, and A. Kareiva
Vilnius Univ., Lithuania

Wednesday, April 23

9:00-12:00 LED3: UV Devices Room 411, 412

Chair: Y. Kumagai, Program Committee Chair,
Tokyo Univ. of Agri. & Tech., Japan

LED3-1 9:00 **(Invited) Crystal Growth of AlN Single Crystal by Sublimation Method**
S. Nagata
JFE Mineral Company, Ltd., Japan

LED3-2 9:30 **(Invited) Recent Progress of AlGaN UVC-LED by Improving Light-Extraction Efficiency**
H. Hirayama
RIKEN, Japan

LED3-3 10:00 **Reliability and Lifetime of Pseudomorphic UV-C LED Product for Instrumentation**
M. Toita [1,2)], J. R. Grandusky [1)], J. Chen [1)], K. Kitamura [1,2)], M. C. Mendrick [1)], C. Moe [1)], Y. Li [1)], K. Nagase [2)], T. Morishita [3)], H. Ishii [3)], S. Yamada [3)], and L. J. Schowalter [1)]
[1)] Crystal IS, U.S.A., [2)] Asahi Kasei, Japan, [3)] Asahi Kasei Microdevices, Japan

LED3-4 10:15 **Nonpolar M-Plane AlGaN Deep-UV LEDs**
R. G. Banal, Y. Taniyasu, and H. Yamamoto
NTT Corp., Japan

----- Break (10:30-10:45) -----

Chair: H. Hirayama, RIKEN, Japan

LED3-5 10:45 **Temperature Dependence of Deep Ultraviolet Emission for Diamond Light Emitting Diodes**
D. Kuwabara [1-3)], T. Makino [2,3)], D. Takeuchi [2,3)], H. Kato [2,3)], M. Ogura [2,3)], H. Okushi [2,3)], and S. Yamasaki [1-3)]
[1)] Univ. of Tsukuba, Japan, [2)] AIST, Japan, [3)] CREST, Japan

LED3-6 11:00 **Investigation of Hole Injection in UV-LEDs Utilizing Polarization Effect**
T. Yasuda [1)], K. Hayashi [1)], T. Nakashima [1)], T. Takeuchi [1)], S. Kamiyama [1)], M. Iwaya [1)], I. Akasaki [1,2)], and H. Amano [2.3)]
[1)] Meijo Univ., Japan, [2)] Akasaki Research Center, Japan, [3)] Nagoya Univ., Japan

LED3-7 11:15 **Optimization of InGaN Superluminescent Diodes: State of the Art Devices and an Analysis of their Limiting Factors**
A. Kafar [1)], S. Stanczyk [1)], G. Targowski [2,3)], P. Wisniewski [1)], T. Suski [1)], U. T. Schwarz [4)], and P. Perlin [1,2)]
[1)] Institute of High Pressure Physics, PAS, Poland, [2)] TopGaN Sp. z o.o., Poland, [3)] Fraunhofer Institute for Applied Solid State Physics IAF, Germany, [4)] Freiburg Univ., Germany

LED3-8 11:30 **The Impact of Al-Composition on Microstructures and Crystalline Quality of Semi-Polar $Al_xGa_{1-x}N$ on GaAs Substrates by MOVPE Growth**
P. Saengkaew [1)], S. Sanorpim [2)], V. Yordsri [3)], C. Thanachayanont [3)], and K. Onabe [4)]
[1)] King Mongkut's Univ. of Technology North Bangkok, Thailand, [2)] Chulalongkorn Univ., Thailand, [3)] MTEC, Thailand, [4)] The Univ. of Tokyo, Japan

LED3-9 11:45 **Optical Properties of Ga-In-O Polycrystalline Films Fabricated by Molecular Precursor Method**
T. Onuma [1,2)], T. Yasuno [2)], S. Takano [2)], R. Goto [2)], S. Fujioka [2)], T. Hatakeyama [2)], H. Hara [2)], C. Mochizuki [2)], H. Nagai [2)], T. Yamaguchi [2)], M. Sato [2)], and T. Honda [2)]
[1)] Tokyo National College of Technology, Japan, [2)] Kogakuin Univ., Japan

----- Lunch Break （12:00-13:15）-----

13:15-18:00 LED4: InGaN Devices Room 411, 412

Chair: Y. J. Kim, Program Committee Member,
Yonsei Univ., Korea

LED4-1 13:15 **(Invited) InGaN Light-Emitting Diodes on c-Face Sapphire Substrates in Green-Yellow Gap Spectral Region**
S. Saito, R. Hashimoto, J. Hwang, and S. Nunoue
Toshiba Corp., Japan

LED4-2 13:45 **(Invited) 740-nm InGaN-Based LEDs by MOVPE**
K. Ohkawa
Tokyo Univ. of Science, Japan

LED4-3 14:15 **Enhancement of Vertical Light Extraction from GaN-Based Blue LEDs Using Moth-Eye Patterned Sapphire Substrate**
M. Ohya [1)], K. Naniwae [1)], T. Kondo [1)], A. Suzuki [1)], M. Mori [1)], T. Kitano [1)], and S. Kamiyama [1,2)]
[1)] EL-Seed Corp., Japan, [2)] Meijo Univ., Japan

LED4-4 14:30 **Investigation of InGaN Light-Emitting Diodes Prepared on High Aspect Ratio Patterned Sapphire Substrate with Sputtered AlN Nucleation Layer**
L. C. Chang, Y. A. Chen, and C. H. Kuo
National Chiao Tung Univ., Taiwan

----- Break （14:45-15:00）-----

Chair: K. Ohkawa, Tokyo Univ. of Science, Japan

LED4-5 15:00 **Roles of Mg Doping in Nitride Semiconductor-Based Light Emitting Diodes with Two Active Regions**
K. Matsui [1)], T. Morita [1)], T. Suzuki [1)], T. Takeuchi [1)], S. Kamiyama [1)], M. Iwaya [1)], and I. Akasaki [1,2)]
[1)] Meijo Univ., Japan, [2)] Akasaki Research Center, Japan

LED4-6 15:15 **Diffusion Injected Multi-Quantum Well Light Emitting Diode Structure**
L. Riuttanen, P. Kivisaari, H. Nykänen, O. Svensk, S. Suihkonen, J. Oksanen, J. Tulkki, and M. Sopanen
Aalto Univ., Finland

LED4-7 15:30 **The Improvement of Efficiency Droop and Current Spreading on Nitride-Based LEDs Using Electron Transmission Layer**
J. S. Jheng [1)], C. K. Wang [1)], Y. Z. Chiou [1)], T. K. Lin [2)], and S. J. Chang [3)]
[1)] Southern Taiwan Univ. of Science and Technology, Taiwan, [2)] Epistar Corp., Taiwan, [3)] National Cheng Kung Univ., Taiwan

LED4-8 15:45 **Growth of High Yield LED Structures on 8" Si(111) Substrates Using High throughput MOCVD Reactors**
B. Krishnan, J. Su, S. M. Lee, G. D. Papasouliotis
Veeco Instruments Inc., U.S.A.

LED4-9 16:00 **Surface Orientation Dependence of the In-Incorporation of THVPE-Grown InGaN Studied by First Principles and Statistical Thermodynamics**
H. Murakami, Y. Fujimura, R. Togashi, Y. Kumagai, and A. Koukitu
Tokyo Univ. of Agri. & Tech., Japan

LED4-10 16:15 **Realization of p-Type Conduction in Mg-Doped N-Polar (000$\bar{1}$) GaN Grown by Metalorganic Vapor Phase Epitaxy**
T. Tanikawa [1,2)], J. H. Choi [1,2)], K. Shojiki [1)], S. Kuboya [1)], R. Katayama [1,2)], and T. Matsuoka [1,2)]
[1)] Tohoku Univ., Japan, [2)] CREST, Japan

----- Break （16:30-16:45）-----

Chair: K. Naniwae, EL-Seed Corp., Japan

LED4-11 16:45 **Growth Optimization of Green InGaN Multi-Quantum Well on Bulk GaN Substrate by in situ Monitoring System**
T. Mitsunari [1)], A. Tamura [1)], S. Usami [1)], M. Kushimoto [1)], K. Yamashita [1)], Y. Honda [1)], Y. Lacroix [3)], and H. Amano [1,2)]
[1)] Nagoya Univ., Japan, [2)] Akasaki Research Center, Japan, [3)] YSystems Ltd., Japan

LED4-12 17:00 **Evaluation of the Optical Polarization Properties in Semi-Polar {11$\bar{2}$2} LEDs**
Y. Okamura, K. Nakao, N. Okada, K. Yamane, and K. Tadatomo
Yamaguchi Univ., Japan

LED4-13 17:15 **Stress Compensated InGaN/AlGaN Superlattices Coherently Grown on Semipolar (11$\bar{2}$2) GaN Substrates**
J. Nishinaka, M. Funato, and Y. Kawakami
Kyoto Univ., Japan

LED4-14 17:30 **Relationship between V-Pit Diameter and Potential Barrier Height in InGaN Based Light-Emitting Diodes**
N. Okada, M. Haziq, K. Yamane, Y. Yamada, and K. Tadatomo
Yamaguchi Univ., Japan

LED4-15 17:45 **Suppression of Metastable-Phase Inclusion in MOVPE-Grown N-Polar (000$\bar{1}$) InGaN/GaN Multiple Quantum Wells**
K. Shojiki [1)], J. H. Choi [1,2)], T. Iwabuchi [1)], N. Usami [3)], T. Tanikawa [1,2)], S. Kuboya [1)], T. Hanada [1,2)], R. Katayama [1,2)], and T. Matsuoka [1,2)]
[1)] Tohoku Univ., Japan, [2)] CREST, Japan, [3)] Nagoya Univ., Japan

Thursday, April 24

9:00-9:45 LED5: White LEDs Room 411, 412

Chair: G. Hatakoshi, Program Committee Member,
Toshiba Corp., Japan

LED5-1 9:00 **(Invited) Sialon Phosphors for Improved White LED**
K. Takahashi [1,2)] and N. Hirosaki [1,2)]
[1)] NIMS, Japan, [2)] SIALON Co., Ltd., Japan

LED5-2 9:30 **High Brightness White LED Prepared by Silicone Layer-by-Layer Coatings with Uniform Distribution of Quantum-Dot-Embedded Silica Nanoparticles**
Y. J. Kim [1)], H. G. Hong [1)], H. S. Jung [2)], H. J. Kim [1)], M. H. Shin [1)], H. Kim [2)], and H. Lee [2)]
[1)] Yonsei Univ., Korea, [2)] Nanosquare Inc., Korea

----- **Break （9:45-10:00）** -----

10:00-11:45 LED6: Short Presentations for Poster Session Room 411, 412

Chair: Y. Honda, Program Committee Member, Nagoya Univ., Japan
T. Yamaguchi, Program Committee Member, Kogakuin Univ., Japan
H. Murakami, Program Committee Member, Tokyo Univ. of Agri. & Tech., Japan
R. Togashi, Program Committee Member, Tokyo Univ. of Agri. & Tech., Japan

----- **Lunch Break （11:45-13:15）** -----

13:15-15:15 LED6: Poster Session Exhibition Hall D

LEDp6-1 **Examination of on the Influence of Boron Flow Rate and Substrate in BGaN Epitaxial Growth**
K.Ueyama, K. Atsumi, H. Mimura, Y. Inoue, T. Aoki, and T. Nakano
Shizuoka Univ., Japan

LEDp6-2 **Rapid Growth of GaN Layers Using Ga_2O Vapor on GaN Substrates Grown by Na-Flux Method**
H. Takatsu [1)], M. Juta [1)], T. Sumi [1)], Y. Bu [1)], A. Kitamoto [1)], M. Imade [1)], M. Yoshimura [1)], M. Isemura [2)], and Y. Mori [1)]
[1)] Osaka Univ., Japan, [2)] Itochu Plastics Inc., Japan

LEDp6-3 **Growth of High Crystallinity Thick GaN Layers Using Ga_2O Vapor**
M. Juta [1)], H. Takatsu [1)], T. Sumi [1)], Y. Bu [1)], A. Kitamoto [1)], M. Imade [1)], M. Yoshimura [1)], M. Isemura [2)], and Y. Mori [1)]
[1)] Osaka Univ., Japan, [2)] Itochu Plastics Inc., Japan

LEDp6-4 **Growth of Homoepitaxial ZnO Thin Layers by Halide Vapor Phase Epitaxy Using Non-Hydrogenous Sources**
R. Asakawa [1)], Y. Isa [1)], N. Kanzaki [1)], S. Y. Kang [2)], A. Hiroe [2)], R. Togashi [1)], H. Murakami [1)], Y. Kashiwagi [2)], Y. Kumagai [1)], and A. Koukitu [1)]
[1)] Tokyo Univ. of Agri. & Tech., Japan, [2)] Tokyo Electron Ltd., Japan

LEDp6-5 **Fabrication of In-Doped ZnO Thin Film by Molecular Precursor Method**
R. Goto, T. Yasuno, H. Nagai, H. Hara, M. Sato, and T. Honda
Kogakuin Univ., Japan

LEDp6-6 **Thermal Stability of β-Ga_2O_3 Substrates in Mixed Flows of H_2 and N_2**
C. Eguchi [1)], T. Fukizawa [1)], S. Hanagata [1)], K. Nomura [1)], K. Goto [2)], R. Togashi [1)], H. Murakami [1)], A. Kuramata [2)], Y. Kumagai [1)], and A. Koukitu [1)]
[1)] Tokyo Univ. of Agri. & Tech., Japan, [2)] Tamura Corp. Ltd., Japan

LEDp6-7 **C-Related p-Type Conduction in AlGaN and AlN**
K. Yamazumi, D. Kim, M. Sekiguchi, and S. Sakai
The Univ. of Tokushima, Japan

LEDp6-8 **InGaN Growth on GaN/Sapphire by Increased-Pressure MOVPE**
K. Yamashita [1)], Y. Honda [1)], and H. Amano [1,2)]
[1)] Nagoya Univ., Japan, [2)] Akasaki Research Center, Japan

LEDp6-9 **Characterization of Dark Spots on GaInN Films by Using Fluorescence Microscope and Secondary Ion Mass Spectroscopy**
N. Toyomitsu [1)], L. Sang [2)], T. Yamaguchi [1)], T. Honda [1)], and M. Sumiya [2)]
[1)] Kogakuin Univ., Japan, [2)] NIMS, Japan

LEDp6-10 **High Efficiency GaN-Based LEDs Grown by Interruption-Free Epitaxial Lateral Overgrowth on Patterned SiO_2 AlN/Sapphire Template**
Y. A. Chen, C. H. Kuo, L. C. Chang, and J. P.Wu
National Chiao Tung Univ., Taiwan

LEDp6-11 **The Evaluation of Optical Characteristic of GaN Double Polarity Selective Area Growth by Using MOVPE**
K. Kuze, Y. Fujita, H. Mimura, Y. Inoue, and T. Nakano
Shizuoka Univ., Japan

LEDp6-12 **In Situ Wafer Temperature Measurement of Gallium Nitride Grown on Sapphire Using Diffuse Reflectance at Two Wavelengths**
Y. Lacroix [1)], K. Yamashita [1)], V. Robichaud [1)], Y. Majima [1)], Y. Honda[2)], and H. Amano[2)]
[1)] YSystems Ltd., Japan, [2)] Nagoya Univ., Japan

LEDp6-13 **Effect of Pseudo Aluminum Templates in RF-MBE Growth of GaN on 4H-SiC**
Y. Watanabe, S. Osawa, D. Tajimi, T. Yamaguchi, and T. Honda
Kogakuin Univ., Japan

LEDp6-14 **Control of Surface Roughness of GaN Seed Crystals by Applying a Dipping Technique to the Na-Flux Method**
T. Sato, M. Imanishi, K. Nakamura, K. Murakami, H. Imabayashi, H. Takazawa, Y. Todoroki, D. Matsuo, M. Maruyama, M. Imade, M. Yoshimura, and Y. Mori
Osaka Univ., Japan

LEDp6-15 **The Relationship between Growth Habit and the Behaviors of Dislocations of GaN Crystals in the Na-Flux Coalescence Growth**
M. Imanishi, K. Murakami, H. Imabayashi, H. Takazawa, Y. Todoroki, D. Matsuo, M. Maruyama, M. Imade, M. Yoshimura, and Y. Mori
Osaka Univ., Japan

LEDp6-16 **High-Speed InN Growth on Yttria-Stabilized Zirconia (111) Substrates by a Two-Step Precursor Generation HVPE System**
C. Kojima, R. Togashi, R. Imai, N. Fujita, H. Saito, H. Murakami, Y. Kumagai, and A. Koukitu
Tokyo Univ. of Agri. & Tech., Japan

LEDp6-17 **Nanoscale Optical Analysis Using Cathodoluminescence Combined with Transmission Electron Microscopy**
A. Maigne and D. J. Stowe
Gatan Inc., U.S.A.

LEDp6-18 **RF-MBE Growth of pn-GaInN Structure and Fabrication of Blue-Green Homojunction-Type Light Emitting Diode**
K. Narutani [1)], T. Yamaguchi [1)], K. Wang [2)], T. Araki [2)], Y. Nanishi [2)], L. Sang [3)], M. Sumiya [3)], S. Fujioka [1)], T. Onuma [1,4)], and T. Honda [1)]
[1)] Kogakuin Univ., Japan, [2)] Ritsumeikan Univ., Japan, [3)] NIMS, Japan, [4)] Tokyo National College of Technology, Japan

LEDp6-19 **Efficiency Improvement of Nitride-Based Light-Emitting Diode with Physical Vapor Deposition AlN Nucleation Layer**
J. Lee [1)], C. H. Yen [1)], W. C. Lai [1)], Y. Y. Yang [1)], C. K. Wang [2)], and S. J. Chang [1)]
[1)] National Cheng Kung Univ., Taiwan, [2)] Southern Taiwan Univ. of Science and Technology, Taiwan

LEDp6-20 **Enhancement in Output Power of Blue Nitride-Based Light Emitting Diodes with an Electron Retarded Layer**
S. B. Chuang [1)], C. K. Wang [1)], Y. Z. Chiou [1)], C. H. Yen [2)], W. C. Lai [2)], and S. J. Chang [2)]
[1)] Southern Taiwan Univ. of Science and Technology, Taiwan, [2)] National Cheng Kung Univ., Taiwan

LEDp6-21 **High Current Density LED Performance on Low Dislocation Density GaN on Sapphire**
T. Sugiyama [1)], K. Yamashita [2)], M. Iwai [1)], Y. Honda [2)], T. Yoshino [1)], and H. Amano [2,3)]
[1)] NGK Insulators, Ltd., Japan, [2)] Nagoya Univ., Japan, [3)] Akasaki Research Center, Japan

LEDp6-22 **Fabrication of InGaN Based Light-Emitting Diode Using Freestanding {20 $\bar{2}$ 1} GaN Substrate**
Y. Denpo, Y. Mitsui, K. Yamane, N. Okada, and K. Tadatomo
Yamaguchi Univ., Japan

LEDp6-23 **Nitride-Based Light Emitting Diodes with Buried Tunnel Junctions**
M. Ino [1)], Y. Kuwano [1)], T. Morita [1)], D. Minamikawa [1)], T. Takeuchi [1)], S. Kamiyama [1)], M. Iwaya [1)], and I. Akasaki [1,2)]
[1)] Meijo Univ., Japan, [2)] Akasaki Research Center, Japan

LEDp6-24 **Fabrication of Vertical-Type GaN-Based Metal Oxide Semiconductor Light-Emitting Diodes**
S. Fujioka [1)], T. Yasuno [1)], A. Sato [1)], T. Onuma [1,2)], H. Nagai [1)], T. Yamaguchi [1)], M. Sato [1)], and T. Honda [1)]
[1)] Kogakuin Univ., Japan, [2)] Tokyo National College of Technology, Japan

LEDp6-25 **Study of High-Reflective Ag-Based Electrode on p-Type GaN**
S. Kawai [1)], D. Iida [1)], M. Iwaya [1)], T. Takeuchi [1)], S. Kamiyama [1)], and I. Akasaki [1,2)]
[1)] Meijo Univ., Japan, [2)] Akasaki Research Center, Japan

LEDp6-26 **Fabrication of Nitride-Based Blue LED with Eliminating Light-Absorptive Laser Scribing Damages**
S. Hanai [1)], I. Nakatani [2)], A. Suzuki [1,3)], T. Kitano [1,3)], D. Iida [1)], T. Kato [1)], M. Iwaya [1)], T. Takeuchi [1)], S. Kamiyama [1)], and I. Akasaki [1,4)]
[1)] Meijo Univ., Japan, [2)] Mitsuboshi diamond industrial, Japan, [3)] EL-Seed Corp., Japan, [4)] Akasaki Research Center, Japan

LEDp6-27 **InGaN Flip-Chip Light-Emitting Diodes with Embedded Air Voids Grown on Selective-Area Ar-Implanted AlN/Sapphire Substrate**
Y. H. Yeh [1)], J. K. Sheu [1)], M. L. Lee [2)], C. J. Chang [2)], P. C. Chen [1)], Y. C. Yang [1)], C. H. Yen [1)], W. C. Lai [1)]
[1)] National Cheng Kung Univ., Taiwan, [2)] Southern Taiwan Univ. of Science and Technology, Taiwan

LEDp6-28 **Auto-Split Laser Lift-Off Technique for Vertical-Injection GaN-Based Green Light-Emitting Diodes**
M. Chen [1)], L. E. Cai [2)], J. Y. Zhang [1)], L. Y. Ying [1)], and B. P. Zhang [1)]
[1)] Xiamen Univ., China, [2)] Xiamen University of Technology, China

LEDp6-29 **Light-Emitting Diode Panel Lamps**
W. S. Cheung, Y. F. Cheung, and H. W. Choi
The Univ. of Hong Kong, Hong Kong

LEDp6-30 **Design Optimization of Pattern Structure for Improving Light Extraction Efficiency of Light-Emitting Diodes with Patterned Sapphire Substrate**
H. Cui and S. H. Park
Yeungnam Univ., Korea

LEDp6-31 **Numerical Study of the LEDs with Injected Current Modulated by Patterned Contact**
I. Khmyrova [1)], N. Watanabe [1)], Ju. Kholopova [2)], A. Kovalchuk [2)], and S. Shapoval [2)]
[1)] Univ. of Aizu, Japan, [2)] IMT RAS, Russia

LEDp6-32 **Phosphor-Converted Light-Emitting Diodes with Advanced Color Rendition Properties**
A. Zabiliūtė, R. Vaicekauskas, P. Vitta, A. Tuzikas, A. Petrulis, and A. Žukauskas
Vilnius Univ., Lithuania

LEDp6-33 **Control of Thickness and Concentration of Color Converting Film Based on Quantum Dots for White LED with High Luminous Efficiency and CRI**
H. J. Kim, M. H. Shin, H. G. Hong, and Y. J. Kim
Yonsei Univ., Korea

----- Break （15:15-15:30）-----

15:30-16:30 LED7: Special Lectures Room 411, 412

Chair: M. Boćkowski,
Institute of High Pressure Physics, PAS, Poland, Top GaN Sp. z o.o., Poland

LED7-1 15:30 **Fundamentals and Integration Technologies for Semiconductor Light-Emitting Devices**
H. Yonezu (Under negotiation)
Toyohashi Univ. of Tech., Japan

LED7-2 16:00 **Red and Blue LEDs: Physics and Applications of Visible Light Emitting Diodes**
G. Hatakoshi
Toshiba Corp., Japan

16:30-16:45 Closing Room 411, 412

Closing Remarks

16:30 Y. Kumagai, Program Committee Chair
Tokyo Univ. of Agri. & Tech., Japan