

12th International Symposium on the Science and Technology of Light Sources and the 3rd White LED Conference (LS-WLED 2010)

Eindhoven, The Netherlands
11 – 16 July 2010

Editors:

**M. Haverlag
G.M.W. Kroesen
T. Taguchi**

ISBN: 978-1-5108-4084-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2010) by Foundation for the Advancement of the Science & Technology of Light Sources (FAST-LS) All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Foundation for the Advancement of the Science & Technology of Light Sources (FAST-LS) at the address below.

Foundation for the Advancement of the Science & Technology of Light Sources
FAST-LS
Belmayne House
99 Clarkehouse Road
Sheffield, United Kingdom
S10 2LN

www.fast-ls.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

List of Invited, Landmark and Contributed Papers

Sunday Lectures

KN01	Notes on history of incandescent lamps <i>W. van den Hoek</i>	3
KN02	Light-up the word: LEDs for under-development countries <i>Dave Irvine-Halliday</i>	

Session One

IL01	Light Source Science & Technology 2010: A New Paradigm Emerges <i>R. Devonshire</i>	15
IL02	LED current status <i>Wu Ling</i>	
IL03	Life Cycle analysis <i>B. Wessler</i>	
LL01	On solder joint reliability in LEDs by Accelerated Life Testing <i>M. Erinc, J. Kloosterman, E.P. Veninga, W.D. van Driel, A.W.J. Gielen, G.Q. Zhang</i>	17
LL02	Highly efficient bulb-shaped ballast-integrated LED lamps replacing incandescent lamps for general lighting <i>M. Segawa, S. Osawa, T. Hisayasu, M. Kamata, T. Hiramatsu, T. Yasuda</i>	19
CP001	Physics and Chemistry of the LiFi® Lamp, Light Emitting Plasma in an Resonant Dielectric Cavity <i>R. Gilliard, M. de Vincentis, A. Hafidi, D. O'Hare, G. Hollingsworth</i>	21
CP002	Photoluminescence of Oxygen Deficiency Centers in Fused Quartz - Effect of Thermal Treatment <i>M. Stamminger, B. Kühn, E. Arnold, H.D. Witzke, F.J. Schilling, A. Schreiber, C. Neumann</i>	23
CP003	High Pulsed power UV and VUV excilamps <i>V.F. Tarasenko, E. Baksh, M. Erofeev, M. Lomaev, D. Rybka, D. Sorokin</i>	25
CP004	Colour rendition properties of solid-state lighting sources <i>A. Žukauskas, R Vaicekauskas, M.S Shur</i>	27
CP005	Effect of Temperature and Current Variation of the Colour Quality of White Light Emitting Diodes <i>O.V. Khokhlev, O.V. Bord, M.V. Bogdanov, K.A. Bulashevich, M.S. Ramm, Y.I. Evstratov, Y.S. Karpov</i>	29
CP006	Microwave excitation of high pressure metal halide lamps <i>M. Kettlitz, R. Kozakov, H. Schneidenbach, R. Methling</i>	31
CP007	The peculiarities of microwave gas discharge as UV-source <i>E.M. Barkhudarov, N.V. Denisova, I.A. Kossyi, M.A. Misakyan</i>	33
CP008	Ultraviolet Radiation Emissions from Compact Fluorescent Lamps and Halogen Lamps <i>T. Cantwell, L. Browne, R. Dowdall</i>	35
CP009	Investigation of low pressure discharge containing InBr <i>S. Briefi, U. Fantz</i>	37
CP010	Driving of dielectric barrier discharge lamps with a pulsed transformer-less full-bridge topology <i>M. Meisser, M. Paravia, R. Kling, W. Heering</i>	39
CP011	Experimental Study of the effect of germicidal lamp power supply on the UV-C bacteria inactivation in water treatment <i>B. Mrabet, M. Ben Said</i>	41
CP012	Capacitively coupled alternating-current light-emitting device for 12 V applications <i>G.Y. Mak, E.Y. Lam, H.W. Choi</i>	43

CP013	Site-controlled GaN photonic crystals by nanosphere lithography <i>K.H. Li, H.W. Choi</i>	45
CP014	Zinc Oxide Nanorods/Polymer Hybrid Junctions for White Light Emitting Diodes <i>M. Willander, N. Bano, S. Hussain, L. Hussain, O. Nur</i>	47
CP015	Synthesis and Characterization of EuZn and TbZn complex emitting red and green colors for organic light-emitting diodes <i>B.H. Kwon, S.W. Kim, D.Y. Jeon</i>	49
CP016	Near Field UV Measurements for Amalgam Lamps <i>R. Kilgour, D.G. Knight</i>	51
CP017	Coupled Simulation of Phosphor Emission and Light Propagation in white LEDs <i>K. Ishida, T. Sato, Y. Hattori, I. Mitsuishi, S. Nunoue</i>	53
CP018	Novel Insights in the electron and hole mobility in organic semiconductors used in OLEDs for lighting applications <i>R.J. de Vries, R. Coehoorn, R.A.J. Janssen</i>	55
CP019	Design of an LED Street Lamp with Rectangular Light Spot <i>H. Shen, X. Zhou, W. Zhang, M. Liu</i>	57
CP020	Energy distribution of below-gap states in InGaN quantum wells revealed by two wavelength excited photoluminescence <i>N. Kamata, T. Yamaguchi, T. Fukuda, Y. Arakawa</i>	59
CP021	CO/Xe 2m long microwave discharge lamp for VUV light source <i>A. Hatta, T. Sakai, K. Kawamura</i>	61
CP022	Study of the 700 nm emitting spectrum using GaInP quantum dots in the AlGaInP-based emitting diodes <i>H.S. Oh, S.M. Kim, H.H. Lee, J.H. Baek, J.S. Kwak</i>	63
CP023	Thermal modelling of a halogen IRC lamp <i>G. van der Poel, S.R. Mekala, N. Parise</i>	65
CP024	Analysis of Degradation by On-Off Test in Ceramic Metal-Halide Lamp <i>J.K. Yang, W.Y. Kim, D.H. Park</i>	67
CP025	Visual color matching of LED and tungsten-halogen light sources <i>K. McGroddy, R. Petluri, P.K. Tseng, J. Yriberry, G. Harbers</i>	69
CP026	Effect of Pulse Voltage Slope on High Pressure Xenon HID Lamps Breakdown Voltage <i>A. Sato, N. Brates, K. Noro, N.Y. Babaeva, M.J. Kushner</i>	71
CP027	Effect of Electrode Structure on Luminous characteristics of Small Diameter Short Xe CCFL <i>K. Ikeda, H. Kurokawa, H. Motomura, M. Jinno</i>	73

Session Two

IL04	Quantifying Circadian Light <i>M. Rea</i>	77
IL05	Mesopic Vision, CIE Standards <i>L. Halonen</i>	
LL03	Plasma lamps for biological Rhythms (PLACAR) <i>R. Kozakov, D. Kunz, C. Stoll, L. Hitzschke, J. Melitke, A. Deitmann, G. Roth, H. Rudolph, K. Barkowsku, H. Schöpp</i>	79
LL04	Investigation of Visual Perception under Dynamic Color Rendering Modulation for Augmented Energy Savings <i>M. Thompson, J. Laski, M. Chipalkatti</i>	81
LL05	Increase growth yield in Horticulture by improvements in LED Lighting <i>A. Valster, C. Tanase, C.L. Hsu, U. van Slooten, J.P. Jacobs</i>	83
LL06	A picture of the Lighting Future after Edison <i>T. Noll</i>	85
CP028	Krypton-85 gas mixture radioactivity comparisons <i>A.T. Gallagher, B.J. Silva, C.T. Almeida, D.M. Baselice, E.M. Yang, F.P. Chaudhari</i>	87

CP029	Spectroscopic Investigation of Indium Bromide for Lighting Purposes <i>H.C.J. Mulders, G.M.W. Kroesen, M. Haverlag</i>	89
CP030	High average power VUV and UV excilamps <i>V.F. Tarasenko, S.M. Avdeev, M. Erofeev, M. Lomaev, E.A. Sosnin, V. Skakun, D. Shitz</i>	91
CP031	SEM Investigation of Al ₂ O ₃ Transport Phenomena in Elliptical Ceramic Metal Halide Lamps <i>J.Gielen, R. Geens</i>	93
CP032	Research on characteristics if the LED lighting using an human body electrical signal <i>W.Y. Cheon, G.H. Kim, J.H. Kim, Y.W. Kim</i>	95
CP033	White LED Characterization under Variable Current Operation <i>J.M. Alonso, D. Gacio, L. Campa</i>	97
CP034	The influence of charge effects on the DC breakdown properties of HID lamps <i>P. Tant, J.Driesen, G. Deconinck</i>	99
CP035	Study of atomic state distribution functions in non-thermal high-frequency electrodeless discharge plasmas <i>N.V. Denisova, G. Revalde, A. Skudra</i>	101
CP036	The Energy Balance of High Intensity Discharge Lamps <i>A.J. Rijke, S. Nijdam, M. Haverlag, J.J.A.M. van der Mullen</i>	103
CP037	Measurement of 254 nm radiant flux in high loaded T5 pressure mercury discharge lamps with Keitz method <i>Y. Zhang, S. Zhang</i>	105
CP038	A Cost effective Design for Better Performance of CFLi in the downlight <i>J. Wang</i>	107
CP039	Design of FR4 PCB with via-holes for improvement thermal resistance and thermal flow in High power LED <i>S.I. Lee, I.T. Shin, J.K. Yang, D.H. Park</i>	109
CP040	Wall blacking of a fluorescent lamp by a short duration turn-on/turn-off operation <i>S. Inoue, T. Kasuya, M. Wada, S. Gotoh</i>	111
CP041	A method to evaluate the acceptability of lightsources as replacements for incandescent lamps <i>P. Rayhnam, S.A. Mucklejohn, B. Preston</i>	113
CP042	Ultraviolet Light Emitting Diodes for Water Treatment <i>D.G. Knight, F. Daymouri, S. Jolly</i>	115
CP043	Modeling Performance Limits for Tungsten Halogen Energy Saving Lamps using Infra-red Reflecting Films <i>S.R. Mekala, G. van de Poel</i>	117
CP044	Low-Pressure Gas Discharge UV Source Using Thermo-Field Emission Carbon Nanotube Array Cathode <i>M. Dionne, S. Coulombe, J.L. Meunier</i>	119
CP045	Determination of HgBr ₂ and SiBr ₄ reaction products in electrodeless metal halide discharge lamps <i>T. Emilsson, D.A. Doughty, T.R. Brumleve</i>	121
CP046	Perceived Brightness in LEDs <i>T.H. Yang, S.F. Liao, C.C. Lee, K. Chang</i>	123
CP047	Implementation of optimal control in optically induced plasma region with non-uniform for threshold breakdown <i>X. Wang, J.H. Yun, G.B. Hong, Y.K. Kim</i>	125
CP048	Effect of the color shift on human perception enhancement by repetitive pulsed operation of LEDs <i>H. Motomura, M. Abe, S. Miyake, M. Jinno</i>	127
CP049	Broad excitation band Barium silicate phosphors for LEDs, Ba ₄ Si ₆ O ₁₆ :Eu ²⁺ and Ba ₅ Si ₈ O ₂₁ :Eu ²⁺ <i>T. Ishigaki, K. Sato, K. Uematsu, K. Toda, M. Sato</i>	129

CP050	Surface analytical investigation of the Tungsten build-up in Ceramic Metal Halide lamps <i>Z. Tóth, T. Russell, Z. Kolozsi, V.K. Josepovits</i>	131
Session Three		
IL06	OLED current status <i>D. Bertram</i>	
IL07	Roll-to-Roll OLED Lighting Technology <i>A.R. Duggal</i>	135
IL08	OLED Technical challenges and the chemistry involved <i>A. Monkman</i>	139
IL09	Organic Light-Emitting Transistors with an Efficiency that Out-performs the Equivalent OLEDs <i>R. Capelli, S. Toffanin, G. Generali, H. Utsa, A. Facchetti, M. Muccini</i>	141
LL07	Methodology of LED's total luminous flux using a compound parabolic concentrator <i>X. Zhou, H. Shen, W. Zhang, M. Liu</i>	143
LL08	Fabrication of High-Brightness Large-Area White OLED with Auxillary Electrodes by Meniscus Printing Process <i>Y. Shinjo, H. Oh-Oka, T. Sawabe, T. Sugizaki, A. Amano, T. Ono, K. Sugi, Y. Mizuno, I. Takasumi, J. Yoshida, S. Enomoto, A. Hirao, L. Amemiya</i>	145
CP051	On the standard evaluation procedure for biological action of light <i>R. Kozakov, H. Schöpp, K. Barkowsky, C. Stoll, D. Kunz</i>	147
CP052	Next generation of automotive HID bulbs: Low power Xenon <i>T. Anger, M. Haacke, L. Küpper, G. Lüttgens, J.S. Straetmans</i>	149
CP053	Predicting Long Lifetimes using Accelerated Reliability Techniques <i>R. Gibson</i>	151
CP054	The Experimental Study of Alternative Mode with Micro Shut down Power Supply Used for Alimentation of High Pressure Discharge Lamp (HP 400W) <i>A. Chamnam, W. Nsibi, M. Stamboli, G. Zissis</i>	153
CP055	Molecular constants and standard enthalpies of formation for the lanthanide monobrides and monoiodides, LnBr _g and LnI _g <i>S.A. Mucklejohn</i>	155
CP056	Determination of Junction Temperature in GaN and AlGaN P Light-Emitting Diodes <i>C.J. Lee, C.H. Chen, Y.J. Lee</i>	157
CP057	Modelling the radiation of diatomic molecules in low pressure discharges <i>U. Fantz, S. Briefi, R. Friedl</i>	159
CP058	Atomic transition probabilities of CeI from Fourier transform spectra <i>J.E. Lawler, J. Chrisholm, D.E. Nitz, M.P. Wood, J. Sobeck, E.A. den Hartog</i>	161
CP059	Modelling of the dynamic behaviour of thin mercury lines luminance for HID lamps <i>L. Bouslimi, M. Stambouli, J.P. Cambronne, G. Zissis</i>	163
CP060	Phase resolved Dy-density and plasma temperature measurements by absorption- and emission-spectroscopy of Dy spectral lines <i>M. Westermeier, C. Ruhrmann, J. Reinelt, J. Mentel, P. Awakowicz</i>	165
CP061	Electronic Ballasts and Sodium Electrolysis in Automotive Headlight Lamps <i>N. Brates, M. Seki, S. Ukegawa, J. Connolly</i>	167
CP062	Dimming Characteristics of Medium and Small Wattage Ceramic Metal Halide Lamps <i>S. Shi, W. Li, L. Chen, J. Liu, S. Zhang</i>	169
CP063	Electrodeless HID Lamps, Excited by Circularly-Polarized Licrowave Discharges <i>J.J. Kim, K.S. Kim, D.H. Won, H.S. Yoon</i>	171
CP064	Superradiance in the sodium D lines of a MHD lamp <i>D. Karabourniotis, E. Drakakis</i>	173

CP065	Accelerated testing of an HID lamp by radiative cooling <i>T. Kasuya, M. Wada, S. Gotoh, D. Itoh</i>	175
CP066	The Scalability Challenge in a Large Wireless controlled Lighting System <i>C. Guo, H.W. van Zeijl, A.Baiano, G. Zhang</i>	177
CP067	Efficacy of optical radiation <i>B. Preston</i>	179
CP068	Compact Surgical Luminaire with Single PhlatLight® LED E. Goldfain, R. Tamburrino	181
CP069	HID lamp acoustic emission signatures and arc distortion <i>W. Kaiser, A.F. Correa, R.P. Marques</i>	183
CP070	Waveform effect on the efficiency of coaxial KrCl* excilamps <i>X. Zhuang, X. Feng, M. Roth, O. Rosier, S. Zhu, S. Zhang</i>	185
CP071	Absolute determination of the quantum efficiency of phosphor powders <i>S. Leyre, L. Pandey, J. Hofkens, W. Fyen, P. Hanselaer</i>	187
CP072	Non-destructive estimation of Xe filling pressure in mercury-free automotive metal halide lamp <i>K. Enoki, H. Motomura, M. Jinno</i>	189
CP073	Thermal management of LED Lamp <i>A. Motoya, M. Kai, Y. Manabe, S. Shida</i>	191

Session Four

IL10	Construction and experimental validation of models for HID lamps <i>J.J.A.M. van der Mullen</i>	195
IL11	Plasma Diagnostics in Discharge-Type Light Sources by Using Electromagnetic Waves <i>K. Tachibana</i>	205
LL09	Modeling of Emitter Loss in Fluorescent Lamps <i>I. Kobayashi, R. Brucksaw, M. Kai, Y. Manabe, Y. Yamagata, R. Devonshire</i>	211
LL10	Measured Vapor Pressures in Metal-Halide Systems with and without Complexing Agents <i>J.J. Curry, E. Estupiñán, W.P. Lapatovich, A. Henins, S.D. Shastri</i>	213
LL11	Study on a new material to replace the thoriated-tungsten electrode <i>T. Uetsuki, A. Matsuro, K. Morri, H. Hatanaka</i>	215
LL12	Modelling mercury-free HID lamps: Breakdown characteristics and thermodynamics <i>N.Y. Babaeva, A. Sato, N. Brates, K. Noro, M.J. Kushner</i>	217
CP074	Sputtering yields of alkaline earth oxides on W electrodes of a fluorescent lamp <i>S. Gotoh, T. Kenmotsu, M. Wada</i>	219
CP075	An Appropriate Arrangement of Multiple LEDs for Optimal Power Need <i>G.C. Hsieh, C.C. Chu</i>	221
CP076	Cost Action MP0602: High Temperature Lead-Free Solders (HISOLD) <i>S.A. Mucklejohn, Toth, Z, N. Hoo</i>	223
CP077	Towards a System Level Reliability Approach for Solid State Lighting <i>F.E. Evertz, W.D. van Driel, J. Kloosterman, G. Vanlier, G.Q. Zhang</i>	225
CP078	Effect of Design Parameters on the UV Radiation Characteristics of Low Pressure Mercury-Rare Gas Discharge Lamp for LCD Backlight <i>K. Misono</i>	227
CP079	Potential health impacts of LED lighting <i>D. Atia, A. Barbier-Salsi, F. Behar-Cohen, J.P. Césarini, O. Enouf, M. Garcia, C. Martinsons, O. Merckel, S. Picaud, F. Viénot, G. Zissis</i>	229
CP080	Power Balance Studies in AR-Hg and KR-Hg T2 Discharges <i>G. Lister, Q. Han, H. Jang, S. Zhang, T. Petrova</i>	231
CP081	Radiative Transition for Neutral Cerium <i>J.J. Curry, D.E. Nitz</i>	233

CP082	Spectral intensity or the N ₂ emission in rare gas low-pressure arc discharges <i>R. Friedl, U. Fantz, F. Vogel</i>	235
CP083	Research on a Tube Element LED <i>Z.L. Chen, Z.L. Chen</i>	237
CP084	Modeling of the discharge plasma parameters on noble gases with water vapor admixture <i>A. General, V. Kelman, Y. Zhmenyak, Y. Shpenik</i>	239
CP085	Influence of Quartz Glass Properties on VUV-Performance of LP-Amalgam-lamps <i>E. Arnold, F.J. Schilling, H.D. Witzke</i>	241
CP086	Luminous efficacy and uniformity studies of mercury free flat lamp <i>B. Caillier, P. Guillot, L. Therese, P. Belengeur</i>	243
CP087	Feed-through Solutions for HID lamps with Ceramic Arc Tubes <i>V. Baier, T. Eckardt, N. Gübler, J. Schielke, B. Spaniol</i>	245
CP088	Optical design for bike forward lighting based on high power LEDs <i>Yi Chien Lo, C.W. Chen, C.C. Sun</i>	247
CP089	EMI from high-pressure Xe lamps - a clean experimental study of the underlying near-anode plasma instability <i>U. Hechtfischer, T. Vos</i>	249
CP090	System Integration Options for LED Module <i>A. Baiano, H.W. van Zeijl, G. Cheng, S. Tarashioon, P. Sarro, G.Q. Zhang</i>	251
CP091	Modification of the blackbody radiation using a selective emitter <i>T. Matsumoto, S. Omori, M. Tomita</i>	253
CP092	Multi-Wavelength DBD-driven exciplex lamp operated with the mercury bromide/rare gases mixtures <i>M.M. Guivan, A.A. Mailinina, A. Brablec</i>	255
CP093	ElectroCandoLuminescence - A Novel Light Source Technology <i>S. Kitsinelis, H. Motomura, M. Jinno</i>	257
CP094	Luminance and efficacy improvement of mercury-free fluorescent lamps by synchronized high voltage application to auxiliary external electrode <i>K. Oka, K. Miyamoto, H. Motomura, M. Jinno</i>	259
CP095	Line-core and line-wing features in the temperature-dependent MgHe photoabsorption spectra <i>L. Reggami, M. Bouledroua</i>	261

Session Five

IL12	Advances in InAlGaN-based deep UV light emitting diode technologies <i>M. Kneisl, T. Kolbe, N. Lobo, J. Stellmach, A. Knauer, V. Küller, H. Rodriguez, S. Einfeldt, M. Weyers</i>	265
IL13	Modern automotive headlamps with improved light sources <i>M. Sasaki</i>	269
IL14	Microcavity Plasma Lighting: Thin Sheet Lamps For General Illumination <i>J.G. Eden, S.J. Park</i>	271
LL13	MOCVD for Solid State Lighting: Recent Advances Towards Larger Wafer Sizes <i>A. Boyd, R. Puesche, F. Schulte, O. Schoen, B. Schineller, M. Heuker</i>	275
LL14	Novel Molecular Discharges <i>R. Hilbig, A. Koerber, S. Schwan, D. Hayashi</i>	277
LL15	Magnetron-powered, Electrodeless, HID Light Source <i>D.B. Eeles, A. Neate, F. Agnello, E.C. Odell, B. Preston, K. Lidström, W. Rönnblom</i>	279
LL16	Molecular constants and standard enthalpies of formation for the lanthanide monochlorides, LnCl_g <i>S.A. Mucklejohn</i>	281
CP096	Continuous self-absorption correction in sphere photometry measurements <i>M. Kotrebai, P. Mathews, R. Malmar</i>	283
CP097	Visual performance of enhanced chroma lighting solutions <i>K. Tóth, I. Deme, L. Balázs, W.W. Beers, G.R. Allen, B.V. Nagy, G. Ábrahám</i>	285

CP098	Comparison between current controlled and voltage controlled pulsed drivers for a Dielectric Barrier Discharge (DBD) lamp <i>A. El-Deib, F. Dawson, G. van Eerden, S. Bhosle, G. Zissis</i>	287
CP099	Photometric characteristics of metal halide lamp <i>M. Hamady, M. Aubès, G. Zissis</i>	289
CP100	Angle of incidence and viewing angle for biologically reasonable lighting <i>K. Barkowsky, R. Kozakov, D. Kunz, C. Stoll, D. Uhrlandt, H. Schöpp</i>	291
CP101	185 nm radiation in the positive column of T2 low-pressure Ar-Hg discharge <i>Q. Han, S. Zhu, G. Lister, S. Zhang</i>	293
CP102	Thermodynamic processes in DBD driven excilamps estimated by jump of pressure method: investigation of acoustic waves and heat generation <i>A.A. Pikulev, V.M. Tsvetkov, E.A. Sosnin, V.F. Tarasenko</i>	295
CP103	Efficiency improvements of ultra high pressure projector lamps by reflecting the unused UV radiation back into the lamp <i>K.C. Paul, T. Takemura, M. Nakayama, T. Igarashi</i>	297
CP104	The Effect of Hydrogen Iodide on the Ignition of Hg-free Metal-halide Lamps <i>E.Estupiñán, R. Pereyra, Y.M. Li, W.P. Lapatovich</i>	299
CP105	Use of refractory abhesives in protection of molybdenum foils and leads <i>N. Voggenauer, T. Emilsson, T.R. Brumleve</i>	301
CP106	Diagnostics of planar XeI* UV exciplex lamp excited by diffuse coplanar surface discharge <i>M.M. Guivan, A. Brablec, P. St'ahel, P. Slavíček, J. Janča</i>	303
CP107	Efficient Driver for Dimmable LED Lighting <i>C.S. Moo, S.N. Lin, W.C. Yang, W. Hong</i>	305
CP108	Enhanced light extraction in light-emitting diodes with photonic crystal structure selectively grown on p-GaN <i>C.Y. Cho, S.E. Kang, K.S. Kim, S.J. Lee, Y.S. Choi, S.H. Han, G.Y. Jung, S.J. Park</i>	307
CP109	UV-C emitting phosphors <i>J.M.A. Caiut, J. Dexpert-Ghys, B. caillier, P. Guillot</i>	309
CP110	To delimit the far-field region of LEDs <i>C.C. Lin, C.C. Sun, W.T. Chien, I. Moreno, Y.C. Lo</i>	311
CP111	Studies on the effect of Impurities in Mercury-free Discharge for Lighting Application <i>A.N. Dagang, S. Bhosle, G. Zissis, A. Corazza, V. Massaro</i>	313
CP112	Towards a predictive model for organic light-emitting diodes: current density, recombination and light emission <i>R. Coehoorn, P.A. Bobbert, R.A.J. Janssen, H.P. Loebl, J.J.M. van de Horst, F.W.A. van Oost, J. Cottaar, S.L.M. van Mensvoort, M. Carvelli, R.J. de Vries</i>	315
CP113	Preperation and luminescence properties of Eu ²⁺ -doped calcium silicon nitride by the carbothermal reduction and simultaneous nitridation of spray-pyrolyzed oxide powder <i>K. Yamaguchi, H.T. Hintzen, A.C.A. Delsing, S. Koda, K. Itatani</i>	317
CP114	Investigation of water photolysis by means of VUV excimeter lamps <i>G. Zvereva</i>	319
CP115	LED-VILLE project: Traffic roundabout LED lighting system. Technical and social approaches <i>M. Aubès, J. Bance, S. Bhosle, L. Massol, P. Sajous, G. Zissis</i>	321
CP116	Attempt to reconstruction of cross-sectional distribution of emission spectra for automotive mercury-free metal halide lamp <i>H. Motomura, S. Inagaki, M. Jinno</i>	323
CP117	Life Cycle Assesment of LED lamps and CFLs as the ideal light source for "sustainable development" <i>N. Yabumoto, A. Hatta, M. Jinno, H. Hattori</i>	325

CP118	Method to Stabilize the Chromaticity Coordinate of White LED composed of RGB-LEDs <i>K. Misono</i>	327
CP119	Emission characteristics of a capacitive discharge based on a mixture of water vapor with helium <i>A.K. Shuaibov, A.N. Malinin</i>	329
Session Six		
IL15	Performance of high-luminous efficacy white LEDs <i>K. Bando</i>	333
IL16	Surface plasmon coupled InGaN/GaN quantum-well light-emitting diodes <i>K.C. Shen, C.F. Lu, C.H. Liao, C.Y. Chen, Z.Y. Yu, C. Hsieh, J.Y Wang, C.H. Lin, Y.W. Kiang, C.C. Yang</i>	339
IL17	New Phosphor Developments <i>R. Withnall, G.R. Fern, T.G. Ireland, A.L. Lipman, R. Stone, J. Silver</i>	341
LL17	Automotive headlamps in the 21st century <i>S.M. Booij, M. Sikkens, J. Schug</i>	349
LL18	Visible Light Communications Based on Modulation of White LEDs <i>J. Vučić, C. Kottke, L. Fernández, K. Habel, A. Paraskevopoulos, K.D. Langer</i>	351
LL19	Improvements of the quantum efficiency in green light-emitting diodes with pre-TMIn flow treatment <i>Y.J. Lee, Y.C. Chen, C.J. Lee, C.M. Cheng, S.W. Chen, T.C. Lu</i>	353
LL20	Development of free-standing InGaN LED devices on ALD- $\text{Al}_2\text{O}_3/\text{Si}$ substrate by wet etching <i>M. Jamil, T. Xu, A. Melton, B. Jampana, T.Zaidi, S. Liu, I. Ferguson</i>	355
CP120	Phosphor converted white LED with improved efficiency <i>B. Kolodin, G. Kuenzler, J. Li, P. Brown, A. Desphande, J. Reginelli</i>	357
CP121	Determination of Thermochemical Parameters for the Tin(II) Halides, SnXX' (X, X' = Cl, Br, I), in Solid, Liquid and Gaseous Phases <i>G. Siddons, H.D.B. Jenkins, S.A. Mucklejohn, R. Devonshire</i>	359
CP122	A reduced order model for the Dielectric Barrier Discharge (DBD) lamp using the Proper Orthogonal Decomposition (POD) technique <i>A. El-Deib, F. Dawson, S. Bhosle, G. Zissis</i>	361
CP123	Solid-state lighting with tailored colour quality <i>A. Žukauskas, R. Vaicekauskas, A. Tuzikas, M.S. Shur</i>	363
CP124	Electric Characteristics of Dielectrics Barrier Discharhe Lamp with Coaxial Construction <i>Y. Watanabe, T. Yamaguchi, M. Kobayashi</i>	365
CP125	High Temperature Reliability of Driver for Solid State Lighting <i>S. Tarashioon, S.W. Koh, W.D. van Driel, G.Q. Zhang</i>	367
CP126	Thermodynamic processes in DBD driven excilamps estimated by jump of pressure method: thermal power controls <i>V.M. Tsvetkov, A.A. Pikulev, E.A. Sosnin, V.F. Tarasenko</i>	369
CP127	A "Class-A2"Ultra-Low-Loss Magnetic Ballast with improved power factor for T5 Fluorescent Lamps <i>W.M. Ng, D.Y. Lia, S.Y.R. Hui, W. Yan</i>	371
CP128	Temperature measurements at thoriated cathodes in a model lamp and its interpretation by numerical simulation <i>A. Bergner, M. Westermeier, C. Ruhrmann, J. Mentel, P. Awakowicz</i>	373
CP129	One dimensional modelling of XeCl barrier discharge exciplexe lamp <i>L.T. Doanh, S. Bhosle, G. Zissis</i>	375
CP130	Cathode sheath formation in Xe_2^* -DBDs- simulation and experimental investigation <i>M. Paravia, S. Belezna, J. Ennslin, R. Kling, W. Heering</i>	377

CP131	Melt-Quench synthesis using arc imaging furnace fr phosphor materials <i>T. Ishigaki, K. Toda, M. Yoshimura</i>	379
CP132	A study on Minimization of Optical Interference in LED Visible Light Communication based on Power Line Communication <i>J.H. Yun, G.B. Hong, Y.K. Kim</i>	381
CP133	Why does the lumen maintenance of sodium-scandium metal halide lamps improve by VHF operation? <i>W. van Erk, G.M.J.F. Luijks, W. Hitchcock</i>	383
CP134	The effect of iris colours to the energy flux distribution on the retina <i>C.J. Jiang, Y.C. Chen, C.C. Sun</i>	385
CP135	Properties of a ceramic metal halide lamp at different frequencies and reduced power <i>W. Li, S. Shi, J. Liu, L. Chen, S. Zhang</i>	387
CP136	LED retrofit liht bulb technology for up to 60W eq. Indascent replacement <i>F. Wagner, I. Bakk, P. Pachler, H. Hoschopf, S. Tasch, F.P.Wenzl, P. Petz, A. Favaralo, I. Wilson, F. Stevens, F. Baldauf, P. Hartmann</i>	389
CP137	Development of high correlated color temperature, 12000K FL <i>H. Yagi, M. Shimizu, T. Morita</i>	391
CP138	Simulation and Optical Characteristics of Secondary Optics for High Efficiency LED Lighting <i>S.M. Lee, G.S. Choi, J.C. Lee</i>	393
CP139	Power supplies for excilamps - a review of structures for UV emission control <i>D.V. Schitz, H. Piquet, R. Diez, M. Djibrillah, S. Bhosle, V.F. Tarasenko, E.A. Sosnin</i>	395
CP140	Photon cascade emission of Pr ³⁺ in strontium aluminate <i>Y. Ikeda, K. Masada, H. Kurokawa, H. Motomura, M. Jinno, K. Tachibana</i>	397
CP141	10klm. Multichannel LED light source for hard edge variable spot with excellent color mixing <i>R. Kurt, E. Lenderink, J. Vries, T. Tukker, M. Spikes, M. van der Lubbe, S. Verbrugh, A. van den Brandt</i>	399
CP142	Optical Characteristics of White LED Composed of Ideal RGB-LEDs <i>K. Misano</i>	401

Session Seven

IL18	Unsaturated ceramic metal halide lamps, A new generation of HID lamps <i>J. Hendricx, J. Vrugt, C. Denissen, J. Suijker</i>	405
IL19	Electrodeless Lamps Technology Overview <i>W. Lapatovich</i>	
IL20	Emitter erosion in fluorescent lamps <i>K. Rackow, F. Signeger, J. Ehlbeck, D. Uhrlandt, K.D. Weltmann, G. Lieder, M. Lieberer</i>	415
LL21	Control methods for Enhancing Run-up of Metal Halide Lamps <i>N.H. Chen, J.A. Olsen</i>	423
LL22	Halide Penetration in Seal Glass for Ceramic Metal Halide Lamps <i>J. He, R. Ramaiah</i>	425
CP143	New Shadow-less getters for discharge lamps <i>A. Corazza, S. Giorgi, M. Riva</i>	427
CP144	CeO ₂ as an oxygen dispenser in ceramic metal halide lamps <i>J. He, T. Russell, Z. Tóth</i>	429
CP145	Color Mixing within Optical Elements to Compensate for Non-Uniform Inherent within Phosphor Coated SSL Devices <i>C. Yiyu</i>	431
CP146	Thermodynamic data and phase diagrams for the InX', TiX' and InX-TiX systems, (X, X' =Cl, Br, I) <i>A.T. Dinsdale, R.H. Davies, S.A. Mucklejohn</i>	433

CP147	High Luminance and Luminous Efficacy Mercury-free Flat Florescent Lamp (MFFL) <i>K.W. Whang, W. Seo, J.C. Jung, B.J. Oh</i>	435
CP148	Colour-saturating LED clusters <i>A. Žukauskas, R. Vaicekauskas, M.S. Shur</i>	437
CP149	Efficiency evaluation of phosphor-white high power light-emitting diodes <i>A. Keppens, P.C. Acuña, H.T. Chen, G. Deconinck, P. Hanselaer</i>	439
CP150	Thermodynamics processes in DBD driven excilamps estimated by jump of pressure method: radiation intensity control <i>E.A. Sosnin, V.M. Tsvetkov, A.A. Pikulev, S.M. Avdeev, V.F. Tarasenko</i>	441
CP151	AC ignition of HID lamps - statistical and formative lag times <i>A. Sobota, J.H.M. Kanders, E.M. van Veldhuizen, F. Manders, M. Haverlag</i>	443
CP152	Determination of the ground state density of Ce in front of the electrode of a YAG lamp by absorption spectroscopy <i>C. Ruhrmann, M. Westermeier, J. Reinelt, J. Mentel, P. Awakowicz</i>	445
CP153	High efficiency T5 lamps with low mercury dose <i>A. Corazza, S. Giorgi, J. Reichhardt, A. Hollstein, C. Harzig</i>	447
CP154	Resonance Radiation of Xenon Excimer Discharges <i>M. Paravia, J. Ensslin, R. Klingm W. Heering</i>	449
CP155	Relationship between corrosion depth and coil dimension in the capillary part of mercury-free ceramic metal halide lamps <i>Y. Takahara, T. Kashiwagi, T. Honma, K. Uemura</i>	451
CP156	Reduction of defects in GaN by using InN islands <i>S.J. Lee, C.Y. Cho, S.H. Han, S.J. Park</i>	453
CP157	Novel Long-life Xenon Short-arc Lamp with AC-operation <i>M. Morkel, U. Hartwig, H. Rehn</i>	455
CP158	Quantifying the environmental benefits of new energy efficient lightsources <i>S.A. Mucklejohn,</i>	457
CP159	Light Extraction Enhancement of GaN-based LEDs <i>C.C. Sun, T.X. Lee, S.Y. Tsai, Y.C. Lo, C.C. Lin, W.T. Chien</i>	459
CP160	Spatial resolution of the light-emission profile in single-layer organic light-emitting diodes <i>M. Carvelli, R.A.J. Janssen, R. Coehoorn</i>	461
CP161	Enhanced performance of a vacuum ultraviolet light source based on Kr ₂ * ($\lambda=146$ nm) and Ar ₂ * ($\lambda=126$ nm) excimeters using short-pulse excitation of a windowless dielectric barrier discharge <i>R.J. Carman, D.M. Kane</i>	463
CP162	Comparison of Microwave and ECG driven Ultra High Pressure Lamps <i>C. Kaiser, M. Paravia, R. Kling</i>	465
CP163	Effects of red-light emitting diodes and ultraviolet-B radiation on growth and photosynthetic characteristics of mung bean <i>F.M. Li, M. Yue, G. Zissis, Z.G. Lu</i>	467
CP164	Microwave discharge performed at a low pressure of Ar/Hg mixture in the coaxial waveguide with a short-cut inner electrode. Experiments and numerical simulations. <i>E.M. Barkhudarov, N.V. Denisova, I.A. Kossyi, E.V. Kulumbaev, N.I. Malykh, M.A. Mysakyan</i>	469
CP165	Molecular radiation from overloaded Hg-free HID <i>R. Methling, S. Franke, L. Hitzschke , L. Käning, B. Schalk</i>	471
CP166	Convection velocity in HID lamp including acoustic resonance <i>A. Toumi, J. Hirsch, B. Baumann, M. Wolff, S. Bhosle, G. Zissis</i>	473
Session Eight		
IL21	Mercury-free HID lamps <i>M. Käning, L. Hitzschke, B. Schalk, M. Berger, S. Franke, R. Methling</i>	477
IL22	Ballasts and drivers for conventional and solid state light sources <i>J. Lester, W. Kaiser, A. El-Deib, F. Dawson</i>	485

IL23	Title not yet known <i>C. Humphreys</i>	
LL23	Compact Fluorescent Lamp End-Of-Life: Behaviour Analysis and Possible Solutions <i>L. Wu, G. Bandyopadhyay, Y. Hu</i>	495
LL24	Energy Saving Medium Wattage Ceramic Metal Halide Lamps <i>J. Tu, A. Dunaevsky, R. Gibson, T. Steere, K. Graham</i>	497
LL25	Thermal management and performance of thermal interface materials in new compact LED lamp-luminaire systems <i>H. Weiss, R. Hüttinger, S. Levchuk, G. Mitic</i>	499
LL26	Drivers for OLEDs <i>J. Jacobs, C. Büttner</i>	501
CP167	Green joining of ceramics <i>D. Dudik, G. Kuenzler, M. Yee</i>	503
CP168	Migration from Electromagnetic Driver to Electronic Driver for MP Lamps <i>B. Himaras, G. Fang, A. Cojocaru, C. Sheculski</i>	505
CP169	Fabrication of Light Emitting Photonic Crystals as the Wavelength Converter for White Light Emitting Diodes <i>S.W. Kim, B.H. Kwon, M. Suh, D.S. Kang, D.Y. Jeon</i>	507
CP170	A HID PSpice lamp model including starting process <i>D. Lin, W. Yan, S.Y.R. Hui</i>	509
CP171	Further discussion on the mechanism of electrode change of UHP lamp driven by different current waveforms <i>W. Zhang, J. Ying, S. Zhang, R. Liang</i>	511
CP172	Determination of rotational temperature of hydrogen molecule and hydroxyl radical in helium-hydrogen high-frequency electrodeless plasma <i>Z. Gavare, M. Zinge, J. Skudra</i>	513
CP173	A new Hg free DBD lamps for applications in medicine <i>E.A. Sosnin, S.M. Avdeev, V.F. Tarasenko</i>	515
CP174	Gas pressure characteristics of decay rate of Ne metastable atoms in cold cathode lamp <i>M. Goto, T. Arai</i>	517
CP175	Evolution of the impurities pressure in discharge lamps using different getter materials <i>A. Corazza, V. Massaro, S. Ceulemans, A. Hendrikx</i>	519
CP176	Phase diagram determination of the DyI ₃ -TII binary system <i>D. Kobertz, K. Hilpert, S. Hansen</i>	521
CP177	Hemispherical InGaN/GaN Light-emitting Diode for efficient fiber coupling <i>L. Zhu, P.T. Lai, H.W. Choi</i>	523
CP178	Emission Enhancement of InGaN MQWs with Surface Plasmon Mediated Layers Ag/ITO <i>C.C. Lee, D.P. Cai, C.C. Chen, B.J. Chen, J.T. Lin, J.Y. Chang</i>	525
CP179	Gas dependency of electrode temperature and emission of emitter material in a low-pressure fluorescent lamp <i>Y. Yamagata, M. Kai, S. Naito, K. Kamio, Y. Manabe, K. Uchino</i>	527
CP180	Psychological building blocks for dynamic road lighting: Understanding light's role in feelings of safety at night <i>Y.A.W. de Kort, A. Haans, L. Geerdinck, D. van Gennip, M. Horst, J. Servaes</i>	529
CP181	Transient Color stability of HID lamps <i>I. Francois, J.T. van der Eyden, W. Broeckx, S. Geudens</i>	531
CP182	DBD-driven Xenon Iodide exciplex lamp operated with a Kr/Xe/I ₂ mixture and attempts for the UV interactions of <i>Saccharomyces cerevisiae</i> <i>M.M. Guivan, H. Dvořáková, H. Vojkovská, J. Slamova, P. St'ahel, P. Slavíček, A. Brabec</i>	533

CP183	Electrode temperature measurement of mercury-free metal halide lamp for automotive HID headlamp operated with square-wave and DC current <i>M. Shido, Y. Itou, T. Serita, S. Yagi,</i>	535
CP184	Clarifying of physical processes in DBD-driven xenon iodide exciplex lamp by means of ICCD imaging, space-, time-resolved spectroscopy and IRLAS <i>M.M. Guivan, H. Motomura, M. Lomaev, M. Jinno</i>	537