

# **2006 IEEE CEIDP**

**IEEE CONFERENCE ON ELECTRICAL INSULATION AND DIELECTRIC PHENOMENA**

**Hyatt Regency Crown Center, Kansas City, Missouri, USA, October 15-18, 2006**

**2006 IEEE CONFERENCE ON ELECTRICAL INSULATION AND DIELECTRIC  
PHENOMENA  
Kansas City, MO, USA  
Oct. 15-18, 2006**

—————**Monday, October 16**—————

**08:15-09:30 The Whithead Lecture**

Chair: Isidor Sauers, Oak Ridge National Laboratory, USA  
Organizer: Isidor Sauers, Oak Ridge National Laboratory, USA

**Behavior of Charge Carriers in Organic Insulating Materials**

Teruyoshi Mizutani

**10:00-12:30 Session 1 General I - (Oral)**

Chair: Bala Pinnangudi, Arizona State University, USA  
Organizer: Ravi Gorur, Arizona State University, USA

**1-1 Characterization of XLPE MV-Size DC Cables by Means of Space Charge Measurements**

Riccardo Bodega, Peter H.F. Morshuis, Edwin J.D. Straathof, U. H. Nilsson, and Gabriele Perego

**1-2 Effect of Crystallinity on Electrical Conduction Characteristics of Poly-L-Lactic Acid**

Fukutaro Kato, Shingo Omori, Makoto Matsushita, and Yoshimichi Ohki

**1-3 Dielectric Properties of Boron Nitride Filled Epoxy Composites**

Chao Zhang, and Gary C. Stevens

**1-4 Behavior Modeling of a  $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$  Ceramic for Capacitor Applications**

Axel Rumeau, P. Bidan, T. Lebey, L. Marchin, B. Barbier, and S. Guillemet

**1-5 Optimized Charge Simulation Models of Horizontal Sphere Gaps**

N.K. Kishore, Gururaj S. Punekar, and H.S.Y. Shastry

**1-6 Some Mechanistic Understanding of the Impulse Strength of Nanocomposites**

Yujie Hu, Robert C. Smith, J. Keith Nelson, and Linda S. Schadler

**14:00-16:00 Session 2A Measurement Techniques - (Poster)**

Chair: Peter Morshuis, Delft University of Technology, Netherlands  
Organizer: Prathap Basappa, Norfolk State University, USA

- 2A-1 Development of a Digital Algorithm Based on Instantaneous Power Transform for On-Line Monitoring of the Dielectric Loss Factor**  
Wang Guan and Li Qing-min
- 2A-2 On-Site Testing of Instrument Transformers**  
Carlos G. Azcarraga, V. Rodolfo Garcia-Colon, and Armando Nava G.
- 2A-3 Dielectric Response Measurements Utilizing Non-Sinusoidal Waveforms**  
Björn Sonerud, Tord Bengtsson, Jörgen Blennow, and Stanislaw M. Gubanski
- 2A-4 On-Line Time Domain Reflectometry Measurements of Temperature Variations of an XLPE Power Cable**  
Valentinas Dubickas, and Hans Edin
- 2A-5 Research on Propulsion Effect of Exploding Wire in Water**  
Zhang Chunxi and Yang Jiayang
- 2A-6 Change in Heat Resistive, Electrical Insulating and Mechanical Properties of Hybrid Made with PDMS and TEOS for the Mole Ratio of Them**  
Tetsushi Oakamoto, Takuya Shindou, Makoto Sugiura, and Shuheii Nakamura
- 2A-7 Multiphysics Simulation to Improve the Understanding of Pressure Wave Propagation Techniques Applied to Composite Polymers**  
Olivier Gallot-lavallée, Jean-Luc Reboud, and Pascal Rain
- 2A-8 Chemical and Physical Changes Observed in Poly(Oxy-1,4 Phenylsulfonyl-1,4 Phenylene) Following Electrical Stressing**  
M. Uttamlal, Sebastien Falcoz, A.Sheila Holmes-Smith, Donald M. Hepburn, Brian G. Stewart, and Richard A. Fouracre
- 2A-9 Space Charge in XLPE Near the Electrode Interfaces**  
Robert J. Fleming, S.B. Lang, and Tadeusz Pawlowski
- 2A-10 Oil Reclamation – Just a Question of Moisture?**  
Peter M. Mitchinson, Paul L. Lewin, Ian L. Hosier, George Chen, and P. Jarman
- 2A-11 Optimal Wavelet Selection to Identify Faults During Impulse Tests**  
S.N. Fernando, M.R. Raghuv eer, and W. Ziomek
- 2A-12 Effects of Moisture on Power Factor of Oil/Paper Insulation**  
Khaled Abdolall, and A. John Vandermaar
- 2A-13 HF/Microwave Impedance of Carbon Nanotube Films**  
Xianming Liu, Amanda V. Ellis, and W. Mike Arnold

**2A-14 Use of Wavelet and Neural Network (BPFN) for Transformer Fault Diagnosis**

Ch. Prasanth Babu, M. Surya Kalavathi, and B.P. Singh

**2A-15 High Temperature Dielectric Behavior of Al/Polyimide/Al Capacitor Structures**

Sombel Diahm, M.L. Locatelli, and T. Lebey

**2A-16 A Fully Self-Consistent Parametric 2D Model of the Filamentary Streamer Head as Applied to Spectral Diagnostics of Streamer Discharges**

Yuri V. Shcherbakov

**2A-17 An Analysis of Highly Synchronized and Space-and-Time Resolved Nitrogen FNS and SPS Emission Temporal Waveforms Produced by the Repetitive DC Streamer Corona**

Yuri V. Shcherbakov, and Leonid I. Nekhamkin

**2A-18 Understanding of Electrical Treeing in PMMA by Partial Discharges and Thermally Stimulated Discharges**

P. Basappa and J. Kim

**2A-19 Assessment of Drying Quality for Power Transformer During Manufacturing Process Using Variation of Transfer Function**

Asghar Akbari, H. Firoozi, H. Borsi, and M. Kharezi

**2A-20 Electrical Properties of a Commercial Resin**

Enis Tuncer, Isidor Sauers, D. Randy James, and Alvin R. Ellis

**2A-21 Lightning Impulse Behavior of Conducting Composite Electrodes**

Magne Runde, O. Lillevik, P. Roseen, O. Granhaug, R. Espeseth, and P. Skryten

**14:00-16:00 Session 2B Charge Storage and Transport - (Poster)**

Chair: Peter Morshuis, Delft University of Technology, Netherlands

Organizer: Elizabeth Da Silva, Simon Bolivar University, Venezuela

**2B-1 Relation Between Space Charge and Pore Size of Nano Porous Electrode for Super Capacitor**

Daisuke Tashima, Kenji Kurosawatsu, Masahisa Otsubo, and Chikahisa Honda

**2B-2 Finite Element Analysis of Charge Injection and Transport in a Dielectric Liquid**

Se-Hee Lee, Francis O'Sullivan, Il-Han Park, Markus Zahn, Leif Pettersson, Rongsheng Liu, Olof Hjortstam, Albert Jaksts, Tommaso Auletta, and Uno Gäfvert

**2B-3 Effect of Antioxidants on Space Charge Generation in Cross-Linked Polyethylene and EPR**

Yasuo Sekii, Atsushi Taya, and Takashi Maeno

**2B-4 Observation of Charge Distribution in Electron Beam Irradiated Polymers Using Pulsed Electro-Acoustic Method**

Wei Dang, Mai Tahara, Junya Taima, Yasuhiro Tanaka, R. Watanabe, and Tatsuo Takada

**2B-5 Electron Irradiation Effects on Polymeric Films Studied by the Pulsed Electro-Acoustic Method**

Virginie Griseri, Charlotte Perrin, Kaori Fukunaga, Takashi Maeno, Bernard Dirrassen, D. Payan, and Christian Laurent

**2B-6 Piezoelectricity of a Single Bubble Formed by Two Oppositely Charged Teflon® -FEP Films**

Heitor Cury Basso, Cláudio Vara de Aquino, Ruy Alberto Pisani-Altamir, Ruy Alberto Corrêa Altamir, and Reimund Gerhard-Multhaupt

**2B-7 Change in Electroluminescence Activity in Polymers Prior to AC Dielectric Breakdown**

D. Mary and D. Malec

**2B-8 Modeling and Measurements of Electric Fields in Composite Oil/Cellulose Insulation**

Uno Gäfvert, Olof Hjortstam, Yuriy Serdyuk, Christer Törnkvist, and Lars Walfridsson

**2B-9 Thermal Wave Probing: Polynomial and Regularized Solutions with L-Curve**

Tadeusz Pawlowski and Robert J. Fleming

**2B-10 Study on the Characteristics of Jatropha and Ricinus Seed Oils as Liquid Insulating Materials**

Suwarno M. Ilyas

**14:00-16:00 Session 2C EHD and HF - (Poster)**

Chair: Peter Morshuis, Delft University of Technology, Netherlands

Organizer: Elizabeth Da Silva, Simon Bolivar University, Venezuela

**2C-1 Experimental Study of Electrohydrodynamic Pumping Feasibility in Microgravity Condition through Conduction Phenomenon**

Mehdi Ashjaee, and Seyed Reza Mahmoudi

- 2C-2 An Experimental Study on NO<sub>x</sub> Treatment in Diesel Engine Combustion Exhaust Gases by Ozone Injection and Absorption Processes**  
Shinsuke Kikuchi and Ryu-ichiro Ohyama
- 2C-3 Optical Characterization of Ionic Wind Field by Means of Laser-Induced Phosphorescence**  
Kentaro Aoyagi, Yu Kitahara, and Ryu-ichiro Ohyama
- 2C-4 An Experimental Evaluation on Ozone Generation by Local Discharge Type Gas Jets**  
Tetsuya Shiotsuka and Ryu-ichiro Ohyama
- 2C-5 Polarity Effect and Flow Characteristics of Wire-Rod Type Electrohydrodynamic Gas Pump**  
Behrooz Komeili, Jen-Shih Chang, and Glenn Harvel
- 2C-6 Derivation of the Korteweg-Helmholtz Electric and Magnetic Force Densities Including Electrostriction and Magnetostriction from the Quasistatic Poynting's Theorems**  
Markus Zahn
- 2C-7 Model for Comprehensive Simulation of Overhead High Voltage Power Transmission Line Galloping and Protections**  
Jicai Hu, Z. Song, Jianguo Ma, and Shijing Wu
- 2C-8 Linear Stability of an Interface Between a Non-Ohmic Liquid and Air Subjected to an Electric Field and Charge Injection**  
Rafael Chicón, and Alberto T. Pérez
- 2C-9 Dielectric Properties of Insulating Materials for Printed Circuit Boards at mm-Waves**  
Masaki Kouzai, Tomohiro Ogiwara, Atsuhiko Nishikata, and Kaori Fukunaga
- 2C-10 Dynamic Characteristics of High Field Electro-Active Silicone and Acrylic Elastomer Actuator Devices**  
Toshikatsu Tanaka, Kenta Saeki, and Kenji Matsuki
- 2C-11 The Influence of Sag in the Electric Field Calculation around High Voltage Overhead Transmission Lines**  
R. Amiri, H. Hadi, and M. Marich
- 2C-12 Film Thickness Dependence of Dissipation Current for LDPE Film under Trapezoid Waveform Application**  
Shingo Tsuboi, Kazuyuki Tohyama, and Masayuki Nagao

**2C-13 Minimization of Local Field Enhancement Along Stress-Grading Systems of HV Large Rotating Machines**

Hassan El-Kishky, Robert Hebner, Mazen Abdel-Salam, and Fredericka Brown

**2C-14 Higher Frequency Performance of Stress-Grading Systems for HV Large Rotating Machines**

Robert Hebner, Hassan El-Kishky, Mazen Abdel-Salam, and Fredericka Brown

**19:00-21:00 Session 3A Prebreakdown and Breakdown in Solids, Liquids, Gases, and Vacuum - (Poster)**

Chair: Paul Lewin, University of Southampton, UK

Organizer: Tony Fouracre, University of Strathclyde, UK

**3A-1 Prediction of Breakdown Voltages in N<sub>2</sub> + SF<sub>6</sub> Gas Mixtures**

S.S. Tezcan, M.S. Dincer, and H.R. Hiziroglu

**3A-2 Investigation on the High Frequency, High Voltage Insulation Properties of Mineral Transformer-Oil**

Mischa Nagel and Thomas Leibfried

**3A-3 Surge Voltage Stresses Across Power Transformer Winding Sections Provided with Metal Oxide Surge Absorber Blocks**

G.R. Gurumurthy, Mohd. Z.A. Ansari, J. Amarnath, and N.K. Kishore

**3A-4 Impulsive Strength of Power Cables with Different XLPE Compounds**

Massimo Marzinotto, Carlo Mazzetti, Massimo Pompili, and Prospero Schiaffino

**3A-5 Effect of Moisture Diffusion and Heat Cycling on Low Voltage Oil-Impregnated-Paper Insulated Distribution Cables**

Simon M. Rowland, Miao Wang, and Mattieu Michel

**3A-6 Effect of Endothermic Reaction Associated with Glass Transition on the Breakdown Strength of Biodegradable Polymer Films**

Fukutaro Kato, Makoto Matsushita, Shingo Omori, and Yoshimichi Ohki

**3A-7 Numerical Modeling of Negative Corona Discharge in Dry Air: The Role of Carbon Dioxide**

Agustín Fernández-Rueda, Francisco Pontiga, and Antonio Castellanos

**3A-8 A Linear Model for the Differences of Breakdown Voltages in IEC 60052 Tables**

Vuttichai Chatpattananan, and N. Pattanadech

- 3A-9 An Asymptotic Regression Predictive Model for Sphere Gap Voltage with Gap Diameter and Gap Spacing**  
Vuttichai Chatpattananan
- 3A-10 Characteristics of the Bipolar Pulsed Discharge in the Water-Air-Solid Particle Mixture**  
Ruobing Zhang, Chi Zhang, Xingxin Cheng, Liming Wang, and Zhicheng Guan
- 3A-11 Comparison of Electroluminescence Phenomenon in LDPE, PET and PEN under the Application of High Electrical Stress**  
Azrul Mohd Ariffin, Paul L. Lewin, and Stephen J. Dodd
- 3A-12 Nitrogen Oxides Generation Induced by Negative Corona Discharge in N<sub>2</sub> + O<sub>2</sub> Mixtures**  
Francisco Pontiga, and Antonio Castellanos
- 3A-13 Correlation of Partial Discharge and Dissolved Gas Analysis Results from Discharge Activity in SRBP**  
Matthew A. Brown, Stephen J. Dodd, Barry Ahern, John Pettinger, and Francis Waite
- 3A-14 Polar/non-Polar Polymer Blends: On Structural Evolution and the Electrical Properties of Blends of Polyethylene and Ethylene - Vinyl Acetate**  
Alun S. Vaughan, Gabriele Gherbaz, Steven G. Swingler, and Norainah Abd Rashid
- 3A-15 Determination of Particle Movement of Conducting Particles in SF<sub>6</sub>/N<sub>2</sub> Mixture GIL Using Monte Carlo Simulation**  
Poonam Upadhyay, Jinka Amernath, B.P. Singh, and Pravin Upadhyay
- 3A-16 Movement of Metallic Particles in Gas Insulated Line Using SF<sub>6</sub> and N<sub>2</sub> Gas Mixture Under the Influence of Power Frequency and Switching Transient Voltage**  
Poonam Upadhyay, Jinka Amarnath, B.P. Singh, and Pravin Upadhyay
- 3A-17 Analysis on Plasma Chemistry in Corona Discharge Process for NO Removal Using Numerical Simulations Method**  
Dong Limin and Wang Peng
- 3A-18 Pre-Ionization Methods for Atmospheric Pressure Discharge Controlled by Dielectric Barrier**  
Zhan Huamao, Ding Lijian, Li Chengrong, and Li Ming
- 3A-19 Numerical Characterization of Electrical Stresses on Dielectric Grease of Rolling Bearings in Induction Motors Fed by PWM Inverters**

Carlo Petrarca, Giovanni Lupò, Biagio De Vivo, Luigi Egiziano, and Vincenzo Tucci

**19:00-21:00 Session 3B Nanodielectrics - (Poster)**

Chair: Patricia Irwin, GE, USA

Organizer: Michele Frechette, IREQ, Canada

- 3B-1 Electrical Tree Growth in EVA-Layered Silicate Nanocomposites**  
Francesco Guastavino, Andrea Dardano, Gian Carlo Montanari, Fabio Deorsola, and Luigi Testa
- 3B-2 Interpretation of Several Key Phenomena Peculiar to Nano Dielectrics in Terms of a Multi-Core Model**  
Toshikatsu Tanaka
- 3B-3 Observation of Space Charge Formation in LDPE/MgO Nano-Composite Under DC Stress at High Temperature**  
Junya Taima, Kensuke Inaoka, Takuya Maezawa, Yasuhiro Tanaka, Tatsuo Takada, and Yoshinao Murata,
- 3B-4 Comparison of Insulation Breakdown Properties of Epoxy Nanocomposites under Homogeneous and Divergent Electric Fields**  
Takahiro Imai, Fumio Sawa, Tamon Ozaki, Yoshiyuki Inoue, Toshio Shimizu, and Toshikatsu Tanaka
- 3B-5 Thermal Properties of LLDPE/Silica Nanocomposites**  
Zhi-dong Han, Changjun Diao, Ying Li, and Hong Zhao
- 3B-6 Dielectric Properties of LDPE/MgO Nanocomposite Material Under AC High Field**  
Kensuke Hinata, Ayano Fujita, Kazuyuki Tohyama, and Yoshinao Murata
- 3B-7 Electrical Properties of Carbon Nanotubes – Syndiotactic Polypropylene Composites**  
Paolo Ciambelli, Biagio De Vivo, Giuliana Gorrasi, Valentina Romeo, Diana Sannino, M. Sarno, Vincenzo Tucci, and Vittoria Vittoria
- 3B-8 Influence of Absorbed Water on the Dielectric Properties and Glass-Transition Temperature of Silica-Filled Epoxy Nanocomposites**  
C. Zou, M. Fu, J.C. Fothergill, and S.W. Rowe
- 3B-9 Dielectric Properties of Epoxy-Alumina Nanocomposites: The Effect of Absorbed Water**  
Chao Zhang and Gary C. Stevens

- 3B-10 AC Electrical Strength Measurements on LDPE Nanocomposites**  
Francesco Guastavino, Alessandro Ratto, Eugenia Torello, Mario Hoyos, Nuria García, H. Reinecke, Esperanza Benito, and Pilar Tiemblo
- 3B-11 On Molecular Dielectrics in Their Role in Shaping and Controlling Nanodielectrics**  
Michel F. Fréchette and Clive W. Reed
- 3B-12 Preliminary Characterization of a Nanodielectric Material**  
Serge Péliou, Simon Besner, M. Fréchette, K.C. Cole, and Dominique Desgagnés
- 3B-13 On the Degree of Exfoliation Affecting the Corona Performance of a Nanodielectric Surface**  
Michel F. Fréchette, R.Y. Larocque, M. Lessard, M.L. Trudeau, R. Veillette, K.C. Cole, and M.-T. Ton That
- 3B-14 Electrical Properties Analysis of Nano-Filled Epoxy by Space Charge Characterization**  
J. Castellon, S. Agnel, A. Toureille, M. Fréchette, K.C. Cole, and Dominique Desgagnés
- 3B-15 Studies of TiO<sub>2</sub> Breakdown Under Pulsed Conditions**  
Guogang Zhao, Ravindra P. Joshi, Vishnu K. Lakdawala, E. Schamiloglu, and H. Hjalmarson

—————Tuesday, October 17—————

**08:00-10:00 Session 4 General II - (Oral)**

Chair: Ravindra Joshi, Old Dominion University, USA  
Organizer: Vishnu Lakdawala, Old Dominion University, USA

- 4-1 Electroporation - How Different Length and Shaped Electrical Pulses Affect the Permeability of Cells**  
Keith Daly and George Chen
- 4-2 Electrical Properties of Biological Tissues - An Impedance Spectroscopy Study**  
David A. Dean, David Machado-Aranda, Thilliyan Ramanathan, Ignacio Molina and Raji Sundararajan
- 4-3 Calculation of Electrical Fields in a Sample with Electrical Tree Channels**  
Prathap Basappa and Jaehwan Kim

**4-4 Field Trials of 400 kV Silicone Rubber Composite Insulators in a Coastal Location**

Jeffrey Robertson, Simon M. Rowland, Yu Xiong, and Sven Hoffmann

**4-5 A Theoretical Investigation for the Development of a Water Tree Dielectric Response Model**

Andrew J. Thomas and Tapan K. Saha

**4-6 Some Fundamentals on Treeing Breakdown in Inorganic-Filler/LDPE Nano-Composite Material**

Rudi Kurnianto, Yoshinobu Murakami, Naohiro Hozumi, Masayuki Nagao, and Yoshinao Murata

**10:30-12:30 Session 5A Outdoor Insulation - (Poster)**

Chair: Simon Rowland, University of Manchester, UK

Organizer: Raji Sundararajan, Arizona State University East, USA

**5A-1 Mechanism Analysis on Hydrophobicity Decrease of Operating Silicone Rubber Insulators**

Xingquan Huang, Linjie Zhao, Chengrong Li, Shuqi Zhang, Jisha Yao, Jun Xiong, and Wei Song

**5A-2 An Outdoor Investigation on Hydrophobicity of Silicone Rubber Insulators in the Temperature Zone**

Linjie Zhao, Chengrong Li, Jisha Yao, Shuqi Zhang, Jun Xiong, Guang Xu, and Weidong Zhang

**5A-3 A Novel Method for Prediction of Flashover of In-Service EPDM Insulators**

Sreeram Venkataraman and Ravi S. Gorur

**5A-4 Chemical Analysis of Outdoor Silicone Materials After Electrical and Environmental Testing**

Andrej Krivda, F. Greuter, J. Rocks, X. Kornmann, and P. Meier

**5A-5 Properties of Corona Discharge Under Positive DC Voltage at Low Atmospheric Pressure**

Defen Yu, Masoud Farzaneh, J. Zhang, L. Shu, Wenxia Sima, and Caixin Sun

**5A-6 Distribution of Leakage Current on Polluted Polymer Insulator Surface**

Yong Zhu, Kenichi Haji, Hirofumi Yamamoto, Takuma Miyake, Masahisa Otsubo, and Chikahisa Honda

- 5A-7 Determination of Long-Term Performance of Polymeric Insulators for Distribution Lines by Salt Fog Method**  
Hiroya Homma, Takeshi Takahashi, Toshiyuki Kuroyagi, Yoshiharu Miyauchi, Naoya Matsuno, Takehiko Saito, Kenjiro Mori, S. Matsuura, Kouji Fujii, Akinori Ohno, and Naoya Ahagon
- 5A-8 Damage Threshold of Polymeric Housing Materials Used for Outdoor HV Insulators**  
Balasubramanian N. Pinnangudi, Ravi S. Gorur, and Christian D. Poweleit
- 5A-9 A Comparative Study of the Impact of Moisture on the Dielectric Capability of Esters for Large Power Transformers**  
Daniel Martin and Z.D. Wang
- 5A-10 Condition Assessment of Porcelain and Toughened Glass Insulators from Residual Strength Tests**  
Ankit P. Mishra, Ravi S. Gorur, Sreeram Venkataraman, and D. Kingsbury
- 5A-11 Characterisation of Field-Aged 400 kV Silicone Rubber Composite Insulators**  
Yu Xiong, Simon M. Rowland, Jeffry Robertson, and Sven Hoffmann
- 5A-12 Nonlinear Electrical Behavior of Treated ZnO-EPDM Nanocomposites**  
Xiaoping Wang, S. Herth, T. Hugener, R.W. Siegel, J. Keith Nelson, Linda S. Schadler, H. Hillborg, and Tommaso Auletta
- 5A-13 Lightning Current and Flashover Path Measurement on High Voltage Transmission Lines**  
Yangchun Cheng, Chengrong Li, and Fei Zhang
- 5A-14 Dynamics Characteristic of V-String Composite Insulators for 330kV Overhead Transmission Line**  
Lei Hou, Liming Wang, and Zhicheng Guan
- 5A-15 Surface Static Properties of Plasma Treated FRP**  
Jong Kwan Park, Claire Gu, and Beak-Su Lee
- 5A-16 Arc Characteristics of Polluted Insulators Covered with Ice**  
Yadollah Sabri, Masoud Farzaneh, and J. Zhang
- 5A-17 New Approach for the Modeling of the Polluted Insulators**  
Mohamed Marich, Hocine Hadi, and Rabie Amiri
- 5A-18 Diagnosis of Degradation Condition of Polymer Material Using Hydrophobic Surface Analysis**  
Tetsuro Tokoro, Satoshi Yanagihara, and Masayuki Nagao

**5A-19 Influence of Angles of V-Strings on DC Flashover Characteristics of Polluted Insulators in High Altitude Areas**

Zhang Fuzeng, Wang Xin, Long Biao, Wang Liming, Guan Zhicheng

**5A-20 Dielectric Spectroscopy in Silicone Rubber Incorporating Nanofiller**

N. Andrés Pérez, Alain Sylvestre, Jean-Louis Augé, Minh Tuan Do, and S.W. Rowe

**5A-21 Corona Ring Design of  $\pm 800$ kV DC Composite Insulator Based on Computer Analysis**

Wenxia Sima, Kun Wu, Qing Yang, and Caixin Sun

**5A-22 Characterization of Aging and Degradation of 28kV Polymeric Insulators Using Electrical Impedance Spectroscopy**

Raji Sundararajan, A.M. Kannan, Edwin Romero, Ignacio Molina

**10:30-12:30 Session 5B Aging - (Poster)**

Chair: Alun Vaughan, University of Southampton, UK

Organizer: N. Kishore, IIT Kharagpur, India

**5B-1 Evaluation of Medium Voltage Stator Bar Groundwall Insulation Under Inverter-Fed Pulses**

Saeed Ul-Haq, Shesha H. Jayaram, and Edward A. Cherney

**5B-2 Statistical Analysis of in Service Failed Epoxy Resin Bushings in a 50 kV Switchgear Assembly**

Rogier A. Jongen, Peter H.F. Morshuis, Johan J. Smit, Anton L.J. Janssen, and Edward Gulski

**5B-3 Deterioration Diagnosis of Insulators for Breakers Using Chemical Evaluation and Mahalanobis-Taguchi (MT) Method**

Shinsuke Miki and Hiroshi Okazawa

**5B-4 Improved Condition Assessment of XLPE Insulated Cables Using the Isothermal Relaxation Current Technique**

Bolarin S. Oyegoke

**5B-5 Ageing of Biodegradable Oils for High Voltage Insulation Systems**

Ian L. Hosier, Alun S. Vaughan, and Francis A. Montjen

**5B-6 The Release of Volatiles During the Thermal Stress of Electric Insulating Materials**

Václav Mentlík, Radek Polanský, and Pavel Prosr

- 5B-7 Effects of X-Ray Radiation on Solid Insulating Materials**  
S. Sudalaimuthu, M. Joy Thomas, S. Senthil Kumar, and V. Vinod Kumar
- 5B-8 A Comparative Study of the Chemical Stability of Esters for Use in Large Power Transformers**  
Daniel Martin, Z.D. Wang, A.W. Darwin, and I. James
- 5B-9 Effect of Ageing on the Impulse Breakdown Strength of Oil-Impregnated Pressboard Used in Power Transformers**  
Hongzhi Ding, Z.D. Wang, and Paul N. Jarman
- 5B-10 Mechanical and Electrical Issues Concerning the Use of Composite Materials for the Supporting Core in Transmission Line Conductors**  
Ravi S. Gorur, N. Chawla, James Hunt, and Mike Dyer
- 5B-11 Kinetic Analysis and Modeling of Ageing Process of Kraft Paper Aged in Natural Ester Dielectric Fluid**  
Hongzhi Z. Ding and Z.D. Wang
- 5B-12 A Method to Detect the Deterioration of HTV Silicone Rubber Under Corona Discharge**  
Ying Liang, Lijian Ding, C.R. Li, Kun Yang, and Youping Tu
- 5B-13 Towards Water-Resistant High Voltage Insulation Systems: An Ageing Study of a Technological Water-Blocking Polymer**  
Laurent L. Barre, Alun S. Vaughan, and Simon J. Sutton
- 5B-14 Failure Analysis of in Service Failed Resin Cable Joints by Means of a Statistical Approach**  
Rogier A. Jongen, Peter H.F. Morshuis, Johan J. Smit, Anton L.J. Janssen, and Edward Gulski
- 5B-15 Diagnosis of Electrical and Mechanical Faults of Induction Motor**  
Hisahide Nakamura, Yousuke Yamamoto, and Yukio Mizuno
- 5B-16 Characteristics of Current Flowing on Plug Under Contaminated and Wetted Condition**  
Masahiro Yagi, Ken-ichi Okabe, Yukio Mizuno, and Toshiyuki Nakagawa
- 5B-17 Dissipation Current Waveform of Water Tree Deteriorated Low Density Polyethylene Sheet**  
Takamasa Furuhashi, Kazuyuki Tohyama, Tomoaki Imai, and Yoshinao Murata
- 5B-18 State Estimation of Accelerated Aged Mineral Filled Epoxy Insulating Materials**  
Michael Budde, Frank Gerdinand, and Michael Kurrat

**5B-19 Space Charge Evolution in XLPE with Long-Term Aging Under DC Voltage - The Effect of Temperature and Polarity Reversals**  
Mahmoud Abou-Dakka, A.T. Bulinski, and Soli Bamji

**5B-20 Dielectric Losses and Breakdown Silicone Gel**  
Minh Tuan Do, Jean-Louis Augé, and Olivier Lesaint

**5B-21 Analyzing Dynamic of Moisture Equilibrium in Oil-Paper Insulation in Power Transformers for Efficient Drying**  
Asghar Akbari, S. DehPahlevan, and H. Borsi

**5B-22 Dielectric Response of Rotating Machine Stator Insulation System**  
Laurent Lamarre and Eric David

**5B-23 Accelerated Acid-Water Aging of RTV Silicone Rubber Coatings**  
Ali Naderian Jahromi, Edward A. Cherney, Shesha H. Jayaram, and Leonardo C. Simon

—————Wednesday, October 18—————

**08:00-10:00 Session 6 General III - (Oral)**

Chair: Lynn Hatfield, Texas Tech University, USA  
Organizer: Vijendra Agrawal, University of Wisconsin, USA

**6-1 Polymer Composite/Nanocomposite Processing and Its Effect on the Electrical Properties**  
Santanu Singha and M. Joy Thomas

**6-2 Breakdown Statistics of Polyimide at Low Temperatures**  
Enis Tuncer, Isidor Sauers, D. Randy James, Alvin R. Ellis, and Marshall O. Pace

**6-3 Partial Discharge Propagation and Degradation Characteristics of Magnet Wire for Inverter-Fed Motor under Surge Voltage Application**  
Naoki Hayakawa, Hiroshi Inano, Kenta Inuzuka, Masato Morikawa, and Hitoshi Okubo

**6-4 Ultrafast Gas Breakdown at Pressures Below One Atmosphere**  
Hermann Krompholz, Lynn Hatfield, Andreas Neuber, Jordan Chaparro, H.Y. Ryu, and William Justis

**6-5 A Classification of Partial Discharge on High Voltage Equipment with Multinomial Logistic Regression**  
Vuttichai Chatpattananan and N. Pattanadech

**6-6 Forecasting Transformer Reliability**

Arjan van Schijndel, Joseph M. Wetzer, and Peter A.A.F. Wouters

**10:30-12:30 Session 7A Partial Discharge Measurements - (Poster)**

Chair: N. Hayakawa, Nagoya University, Japan

Organizers: Gorur G. Raju, University of Windsor, Canada and Nori Shimizu, Meijo University, Japan

**7A-1 A Study of SO<sub>2</sub> Removal by Positive Pin-Plate Discharge System**

Dong Limin, Han Zhidong, Wu Ze, and Yang Jiaxiang

**7A-2 Partial Discharge Potential Free Test Methods**

Václav Mentlík, Josef Pihera, Pavel Trnka, and Petr Martinek

**7A-3 Partial Discharges in Silicone Gel in the Temperature Range 20-150 C**

Minh Tuan Do, Jean-Louis Augé, and Olivier Lesaint

**7A-4 Partial Discharge Characteristics of Nanocomposite Enameled Wire for Inverter-Fed Motor**

Kenta Inuzuka, Hiroshi Inano, Naoki Hayakawa, Tatsuya Hirose, Masahiro Hamaguchi, and Hitoshi Okubo

**7A-5 Continuous and Pulsed X-Ray Induced Partial Discharges: Similarities and Differences**

Guilherme Cunha da Silva, Vitoldo Swinka Filho, and Rene Robert

**7A-6 Effect of Cabling and Grounding Configuration on Surge Voltages in Inverter-Fed Motors**

Kotaro Wada, Kosei Tsuji, Hirotaka Muto, and Osamu Yashiro

**7A-7 Simulation and Analysis of Acoustic Wave Propagation Due to Partial Discharge Activity**

Prasanta Kundu, Nudurupati Krishna Kishore , and Avinash Kumar Sinha

**7A-8 Low Pressure Partial Discharge Investigation with FEM Modeling for a Twisted Pair of Insulated Conductors**

Xin Liu

**7A-9 Relationship Between PD-Induced Electromagnetic Wave Measured with UHF Method and Charge Quantity Obtained by PD Current Waveform in Model GIS**

Shinya Ohtsuka, Takashi Teshima, Satoshi Matsumoto, and Masayuki Hikita

- 7A-10 3-D Simulation and Modelling of Acoustic Signals from Partial Discharge Activity**  
Syed Aqeel Ashraf, Brian G. Stewart, Chengke Zhou, and J. Mohd Jahabar
- 7A-11 Extraction of PD Signals from an Electro-Optic Modulator Based PD Measurement System**  
Liwei Hao, Paul L. Lewin, and Stephen J. Dodd
- 7A-12 Linear Discriminant Analysis for Partial Discharge Classification on High Voltage Equipment**  
Vuttichai Chatpattananan
- 7A-13 Partial Discharges Measured at Semi-Square Voltages**  
Elisabeth Lindell, Tord Bengtsson, Jörgen Blennow, and Stanislaw M. Gubanski
- 7A-14 Partial Discharge Measurements for a Twisted Pair of Insulated Conductors at Low Pressures - Pulse Waveform Analysis for Argon and Helium**  
Xin Liu, Donald G. Kasten, Stephen A. Sebo, Dennis F. Grosjean, and Daniel L. Schweickart
- 7A-15 Frequency Distribution of RF Energy from PD Sources and Its Application in Combined RF and IEC60270 Measurements**  
Alistair J. Reid, Martin D. Judd, Brian G. Stewart, and Richard A. Fouracre
- 7A-16 Wavelet Packet Denoising of Partial Discharge Data**  
Carlo Petrarca and Giovanni Lupò
- 7A-17 Analysis of Conditions of Partial Discharges Inception and Development at Non-Sinusoidal Testing Voltages**  
Barbara Florkowska and Pawel Zydron
- 7A-18 New Approaches in Arrival Time-Based PD Location in Transformers**  
Sacha M. Markalous and Thomas Strehl
- 7A-19 Extraction of Partial Discharges from Noises by Use of Wavelet and Pulse-Shaped Analysis**  
Jian Li, Stanislaw Grzybowski, Lin Du, and Youyuan Wang
- 7A-20 The Use of the Pulse Sequence Analysis to Monitor the Condition of Oil**  
Rainer Patsch, Johannes Menzel, and Djamal Benzerouk
- 7A-21 Partial Discharge Measurements in a High Temperature Superconducting Triaxial 5-m Model Cable at Liquid Nitrogen Temperature**  
Isidor Sauers, D. Randy James, Enis Tuncer, Alvin R. Ellis, and Marshall O. Pace

**10:30-12:30 Session 7B Bio, Surface - (Poster)**

Chair: Raji Sundararajan, Arizona State University East  
Organizer: Mike Arnold, Industrial Research Ltd, New Zealand

**7B-1 Dielectric Properties of Biodegradable Polymers**

Yoshimichi Ohki and Naoshi Hirai

**7B-2 Prediction of Physical Properties of Yeast Cell Suspensions Using Dielectric Spectroscopy**

D.J. Currie, M.H. Lee, and R.W. Todd

**7B-3 Forces Acting on Biological Cells in External Electrical Fields**

Igor V. Timoshkin, Scott J. Macgregor, Richard A. Fouracre, M.J. Given, and John G. Anderson

**7B-4 Electric Properties of Vegetable-Oil-Based Dielectric Liquid and Lifetime Estimation of the Oil-Paper Insulation**

Caixin Sun, Jian Li, Xiaohu Li, and Stanislaw Grzybowski

**7B-5 Water Processing by High Intensity Pulsed Electric Fields**

Fermin Espino-Cortes, Ayman H. El-Hag, Othano Adedayo, Shesha Jayaram, and W. Anderson

**7B-6 Modified Finite Element Method to Consider the Singularity of the Electric Field Using a Singularity Function**

Yeon-Ho Oh, Ki-Dong Song, Hong-Kyu Kim, and Sung-Kwan Park

**7B-7 Frequency Characters of Leakage Current on the Surface of Outdoor Insulators in Different Relative Humidity**

Mao Yingke, Guan Zhicheng, Wang Liming, Wang Xin, and Yue Bo

**7B-8 Electrical Surface Resistivity of Organic Coating Resin in Arc-Decomposed SF<sub>6</sub> Gas**

Tadao Minagawa, Haruhiko Kohyama, Yuji Yoshitomo, Makoto Miyashita, and Eiichi Nagao

**7B-9 Non-Uniform Field Breakdown and Surface Flashover in Liquid Nitrogen Gaps for HTS Applications**

D. Randy James, Isidor Sauers, Enis Tuncer, Alvin R. Ellis, Kasegn Tekletsadik, and D.W. Hazelton

**10:30-12:30 Session 7C Treeing, Polarization - (Poster)**

Chair: Eric David, Ecole de Technologie Superieure, Canada

Organizer: Sreeram Venkataraman, Arizona State University, USA

- 7C-1 Water Migration in Degraded XLPE Cables**  
Bolarin S. Oyegoke, David Bitrwhistle, Jim Lyall, and Tapan K. Saha
- 7C-2 Dielectric Relaxation Study in Tantalum Pentoxide Capacitors**  
Jean-Philippe Manceau, Sylvie Bruyere, Simon Jeannot, Alain Sylvestre, and Patrice Gonon
- 7C-3 Influence of Vacuum Evacuation on Electrical Tree Initiation in Silicone Rubber**  
Yoshihisa Kamiya, Yuji Muramoto, and Noriyuki Shimizu
- 7C-4 Electroluminescence Properties under Long Time Voltage Application in XLPE**  
Takamori Mito, Motoo Watanabe, Yuji Muramoto, and Noriyuki Shimizu
- 7C-5 Influence of Water-Tree Degradation on Electroluminescence Spectrum in XLPE**  
Motoo Watanabe, Takamori Mito, Yuji Muramoto, and Noriyuki Shimizu
- 7C-6 Life Prediction of XLPE Subjected to Distorted Voltages in Presence of Bush-Like Electrical Treeing**  
Francesco Guastavino, Gianfranco Coletti, Andrea Dardano, Alessandro Ratto, and Eugenia Torello
- 7C-7 Impact of the Polymerization Process on the Electrical Behavior of Different Impregnation Varnishes**  
Fabrice Aymonino, T. Lebey, D. Malec, C. Petit, J. Saint Michel, and A. Anton
- 7C-8 The Use of Cable System Models for the Assessment of Space Charge Behaviour in Full-Size DC Cable Systems**  
Riccardo Bodega, P.H.F. Morshuis, Gian Carlo Montanari, Davide Fabiani, and J.J. Smit
- 7C-9 Dielectric Response of SRBP as a Function of Oil and Oil/Moisture Absorption**  
Matthew A. Brown, Stephen J. Dodd, Barry Ahern, John Pettinger, and Francis Waite
- 7C-10 Dielectric Measurements of Rotating Machines Insulation at High Temperature (200-400 C)**  
Fabrice Aymonino, T. Lebey, D. Malec, C. Petit, J. Saint Michel, and A. Anton

**7C-11 Complex Permittivity Characterization of Double Oxides of the Perovskite Crystal Structure**

John A. Mergos, John E. Daskalakis, and Constantine T. Dervos

**14:00-16:00 Session 8 General IV - (Oral)**

G rard Touchard, University of Poitiers, France

Organizer: Mahmoud Abou-Dhaka, National Research Council, Canada

**8-1 Packet-Like Charge in Polyethylene Probed with a 2D-Spatial Resolution**

Masumi Fukuma, Kaori Fukunaga, and Christian Laurent

**8-2 Elastic Properties and Electromechanical Coupling Factor of Inflated Polypropylene Ferroelectrets**

Michael Wagner, Enis Tuncer, Reimund Gerhard-Multhaupt, and S. Bauer

**8-3 Modeling the Effect of Ionic Dissociation on Charge Transport in Transformer Oil**

Francis O'Sullivan, Se-Hee Lee, Markus Zahn, Leif Pettersson, Rongsheng Liu, Olof Hjortstam, Tommaso Auletta, and Uno G fvert

**8-4 Comparison of Breakdown Performances of Extruded Cables Via the Enlargement Law**

Massimo Marzinotto, Giovanni Mazzanti, and Carlo Mazzetti

**8-5 Corona Characteristics in Conductor-to-Plane Gaps as Influenced by Nearby Floating Metallic Grids**

A. Hashem, Mazen Abdel-Salam, A. Turkey, and A. Abdel-Aziz

**8-6 Optimum Timing of Stator Winding Maintenance Based on a Combination of On-Line Partial Discharge Measurements and Visual Inspections**

Bernhard Fruth and Stefan Lanz

**8-7 Examination of the Influence of Streamer Growth Criteria on Morphology**

Minkyu Kim, Robert E. Hebner, and Gary A. Hallock