

# **2010 10th IEEE International Conference on Solid Dielectrics (ICSD 2010)**

**Potsdam, Germany  
4 – 9 July 2010**



**IEEE Catalog Number: CFP10ICS-PRT  
ISBN: 978-1-4244-7945-0**

# TABLE OF CONTENTS

## PRESENTATIONS

### E. O. FORSTER MEMORIAL LECTURE

<b>A0 Role of Surface Charging in the Performance of Polymeric High Voltage Insulation Systems</b> .....	1
<i>S. Gubanski</i>	
<b>A1-1 Hygrothermal Ageing of a Filled Epoxy Resin: Measurements of the Insulation Properties and Qualitative Modelling</b> .....	12
<i>P. Rain, E. Brun, C. Guillermin, S. Rowe</i>	
<b>A1-2 Dielectric Spectroscopy Study of Thermally-aged Extruded Model Power Cables</b> .....	16
<i>T. Liu, J. Fothergill, S. Dodd, L. Dissado, U. H. Nilsson, M. Fu, F. Perrot</i>	
<b>A1-3 Dielectric Properties of Service Aged Medium Voltage XLPE Cable Joints</b> .....	20
<i>F. Mauseith, K. D. Hammervoll, S. Hvidsten</i>	
<b>A1-4 Using the Design of Experiments (DoE) Method to Elaborate an Electrical Ageing Model for the Insulation of Low Voltage Rotating Machines Fed by Inverters</b> .....	24
<i>N. Lahoud, M. Q. Nguyen, P. Maussion, D. Malec, D. Mary</i>	
<b>A2-1 Aging of Oil-impregnated Transformer Insulation Studied through Partial Discharge Analysis</b> .....	28
<i>X. Chen, P. H. F. Morshuis, Q. Zhuang, J. J. Smit, Z. Xu</i>	
<b>A2-2 Life Prediction for Epoxy Resin Insulated Transformer Windings through Accelerated Aging Tests</b> .....	32
<i>Q. Zhuang, P. H. F. Morshuis, X. Chen, S. Meijer, J. J. Smit, Z. Xu</i>	
<b>A2-3 The Study on Ablation Resistance of Epoxy Resin Based Composite in Vacuum</b> .....	36
<i>W. Shen, C. Pan, K. Wu, M. Ding, Y. Cheng</i>	
<b>A2-4 The Impact of Water Absorption on the Dielectric Properties of Syntactic Foam</b> .....	40
<i>A. Strauchs, A. Mashkin, A. Schnettler, J. Podlazny</i>	
<b>A2-5 Surface Flashover of Micro TiO<sub>2</sub> Epoxy Composite Dielectric under Nanosecond Pulse in Transformer Oil</b> .....	44
<i>Z.-B. Wang, Y.-H. Cheng, Y. Chen, G.-D. Meng, M. Ding, W. Lu, K. Wu</i>	
<b>A2-6 Study on the Pulsed Vacuum Surface Flashover Characteristics of Epoxy Composites with MicroTiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub>·3H<sub>2</sub>O Fillers</b> .....	48
<i>Y.-H. Cheng, Z.-B. Wang, Y. Chen, G.-D. Meng, M. Ding, W. Lu, K. Wu, X. Chen</i>	
<b>A2-7 Electric Field Calculation and Grading Ring Optimization of Composite Insulator for 500kV AC Transmission Lines</b> .....	52
<i>J. Li, Z. Peng, Y. Feng, X. Fu, T. Xie</i>	
<b>A2-8 Experimental Model of a Quartz/Epoxy Interface submitted to a Hygrothermal Ageing: a Dielectric Characterization</b> .....	56
<i>P. Rain, E. Brun, C. Guillermin, S. Rowe</i>	
<b>A2-9 Investigation on Different Maintenance Rules in the case of Load Variation</b> .....	60
<i>W. Cao, K. Wu, T. Fan, J. Zhou, G. Huang</i>	
<b>A2-10 Creep Behaviour of Commercial Glass Fiber Filled Thermoplastics for Use in Medium Voltage Metal Enclosed Switchgear</b> .....	64
<i>M. Runde, P. Roseen, A. Mattozzi, R. Espeseth, O. Granhaug, P. Skryten</i>	
<b>A2-11 Electroluminescence of Ultraviolet and Thermally Aged Low Density Polyethylene</b> .....	68
<i>D. H. Mills, P. L. Lewin, G. Chen, A. M. Ariffin</i>	
<b>A2-12 A Comparison between LDPE and HDPE Cable Insulation Properties Following Lightning Impulse Ageing</b> .....	72
<i>N. L. Dao, P. L. Lewin, I. L. Hosier, S. G. Swingler</i>	
<b>A2-13 Influence of the Temperature on the Dielectric Properties of Epoxy Resins</b> .....	76
<i>S. J. Dodd, N. M. Chalashkanov, J. C. Fothergill, L. A. Dissado</i>	
<b>A2-14 The Effect of Accelerated UV-Ageing on the Dielectric Properties of PVC, PTFE, and HDPE</b> .....	80
<i>J. A. Mergos, M. D. Athanassopoulou, T. G. Argyropoulos, C. T. Dervos, P. Vassiliou</i>	
<b>A2-15 Electro-Thermal Aging Tests on Different Kinds of Enamelled Wires</b> .....	84
<i>F. Guastavino, A. Ratto, S. Squarcia, E. Torello</i>	
<b>A2-16 Influence of Ageing on Space Charge and Electroluminescence of Epoxy Resin</b> .....	88
<i>A. S. Alghamdi, D. H. Mills, P. L. Lewin</i>	
<b>A2-17 The Influence of Water Content and Ageing Degree of Paper Insulation on its Mechanical Strength</b> .....	92
<i>P. Przybyłek, H. Moscicka-Grzesiak</i>	

<b>A2-18 Degradation Mechanism of Epoxy-based Composite Sheet Subjected to Repetitive Voltage Pulses under High Temperature</b> .....	95
<i>K. Kadowaki, K. Arita, J. Etsuda, T. Ohta, S. Kiyohara, S. Mitsuya</i>	
<b>A2-19 Effects of Magnetic Field on Tracking Failure of Gamma-ray Irradiated Polymer Insulating Materials</b> .....	99
<i>B. X. Du, H. J. Liu, X. H. Wang</i>	
<b>A2-20 Effects of Interfacial Pressure on Tracking Failure at XLPE Cable joint by Analyzing Discharge Light Distribution</b> .....	103
<i>B. X. Du, L. Gu</i>	
<b>A2-22 Decay Behavior of Surface Charge on Gamma-Ray Irradiated Epoxy Resin</b> .....	107
<i>Y. Gao, B. X. Du, Z. L. Ma, X. H. Zhu</i>	
<b>A2-23 Influence of Composite Insulator Inclination on its Properties Degradation in Rain Conditions</b> .....	111
<i>W. Bretuj, J. Fleszyński, K. Wieczorek</i>	
<b>A2-24 Development of the p-factor in an Accelerated Ageing Experiment of the MV PILC Cables</b> .....	115
<i>C. Weindl, I. Mladenovic, T. Scharrer, R. Patsch</i>	
<b>A2-25 DSC Study of Polyethylene Terephthalate's Physical Ageing</b> .....	119
<i>N. Douliche, M. W. Khemici, A. Gourari, M. Bendaoud, M. W. Khemici</i>	

## **NANODIELECTRICS AND COMPOSITES**

<b>B1-0 Nanodielectrics - A “Universal” Panacea for Solving All Electrical Insulation Problems?</b> .....	123
<i>M. F. Fréchet, A. Vijh, M. L. Trudeau, D. Fabiani, L. Utracki, S. Gubanski, A. Sami, E. David, J. Kindersberger, C. Laurent, C. Reed, P. Morshuis, T. Andritsch, R. Kochetov, A. Krivda, A. Vaughan, J. Fothergill, S. Dodd, J. Castellon, F. Guastavino, H. Alamdari</i>	
<b>B1-00 Nanodielectrics - A Panacea for Solving All Electrical Insulation Problems?</b> .....	126
<i>M. F. Fréchet, A. Vijh, L. Utracki, M. L. Trudeau, A. Sami, C. Laurent, P. Morshuis, A. Vaughan, E. David, J. Castellon, D. Fabiani, S. Gubanski, J. Kindersberger, C. Reed, A. Krivda, J. Fothergill, F. Guastavino, H. Alamdari</i>	
<b>B1-1 Buds for Treeing in Epoxy Nanocomposites and their Possible Interaction with Nano Fillers</b> .....	155
<i>T. Tanaka</i>	
<b>B1-2 Nanostructured Dielectric Materials</b> .....	159
<i>Y. Cao, Q. Chen, D. Q. Tan, P. C. Irwin</i>	
<b>B1-3 Investigation on the Dielectric Properties of Nanotitanium Oxide - Low Density Polyethylene Composites</b> .....	163
<i>S. Li, G. Yin, F. Ni, S. Bai, J. Li, T. Zhang</i>	
<b>B2-1 Comparison of Rheological, Thermal and Electrical Properties of Poly(ethylene oxide) Composites with Micro and Nano Sized Silicon Dioxide Filler</b> .....	167
<i>M. Reading, A. S. Vaughan</i>	
<b>B2-2 Nano- and Micro-silica Modification of Epoxy Polymers</b> .....	171
<i>T. Rouyre, A. C. Taylor, M. Fu, F. Perrot, I. James</i>	
<b>B2-3 Short Term DC Breakdown Strength in Epoxy Based BN Nano- and Microcomposites</b> .....	175
<i>T. Andritsch, R. Kochetov, Y. T. Gebrekiros, P. H. F. Morshuis, J. J. Smit</i>	
<b>B2-4 Application of Nonlinear Methods in Tracking Failure Test of Epoxy/SiO<sub>2</sub> Nanocomposite</b> .....	179
<i>B. X. Du, J. W. Zhang, L. Gu, H. J. Liu</i>	
<b>B2-5 Effect of Low Amount of Nanosilica on Dielectric Properties of Polypropylene</b> .....	183
<i>M. Takala, B. Sonnerud, H. Ranta, J. Pelto, S. Ahonen, M. Petterson, K. Kannus</i>	
<b>B2-6 Dielectric Properties of LDPE-SiO<sub>2</sub> Nanocomposites</b> .....	188
<i>F. Ciuprina, I. Plesa, P. V. Notingher, P. Rain, T. Zaharescu, D. Panaitescu</i>	
<b>B2-7 Space Charge Behavior in Multi-layered Dielectrics with LDPE and LDPE/MgO Nanocomposites</b> .....	192
<i>E. Kanegae, Y. Ohki, T. Tanaka, Y. Sekiguchi, Y. Murata, C. C. Reddy</i>	
<b>B2-8 Dielectric Frequency Response of Epoxy-based Composites with Various Silica Filler Sizes</b> .....	196
<i>P. H. F. Morshuis, T. Andritsch, R. Kochetov, M. F. Fréchet, H. D. Martinez, S. Savoie, A. Krivda, L. E. Smith, D. Zegarac</i>	
<b>B2-9 Epoxy/Silica Nanocomposite Dielectrics Used for Vacuum Pressure Impregnating Application</b> .....	200
<i>P. Jiang, Y. Zheng, X. Huang, F. Liu</i>	
<b>B2-10 Influence of Ring-Main-Units and Substations on the Propagation of PD Pulses</b> .....	204
<i>P. Wouters, P. Wagenaars, P. van der Wielen, F. Steenis</i>	
<b>B2-11 Epoxy Based Materials Containing Micro and Nano Sized Fillers for Improved Electrical Characteristics</b> .....	208
<i>D. Fabiani, G. C. Montanari, A. Krivda, L. E. Schmidt, R. Hollertz</i>	

<b>B2-12 Electrical Breakdown of Polyurethane-based Nanocomposites</b> .....	212
<i>A. Ersoy, H. R. Hiziroglu</i>	
<b>B2-13 Space Charge Measurements on Different Epoxy Resin-alumina Nanocomposites</b> .....	215
<i>F. Margraner, A. Garcia-Bernabé, M. Gil, P. Llovera, S. J. Dodd, L. A. Dissado</i>	
<b>B2-14 Effect of Nano-additive Size on the Space Charge Behaviour in LDPE/SiO<sub>2</sub> Nanocomposite</b> .....	219
<i>J. Wu, W. Liu, Y. Zhen, Q. Wang, Y. Yin</i>	
<b>B2-15 Temperature Effect on Space Charge Dynamics in LDPE/MgO Nanocomposite under DC Stress</b> .....	223
<i>Y. Zheng, Q. Wang, Y. Yin, X. Li</i>	
<b>B2-16 Polyamideimide-alumina Nanocomposites for High-temperatures</b> .....	227
<i>C. Calabrese J. K. Nelson, L. S. Schadler, D. Schweickart</i>	
<b>B2-17 Study of Space Charge Characteristics in Epoxy Resin and its Nanocomposites</b> .....	231
<i>S. Das, N. Gupta</i>	
<b>B2-19 Improving Surface Flashover Performance in Vacuum through Co-firing Mo/Al<sub>2</sub>O<sub>3</sub> Cermets and Al<sub>2</sub>O<sub>3</sub> Ceramics</b> .....	235
<i>S. Li, T. Zhang, J. Sun, Q. Huang</i>	
<b>B2-20 A Simulation of Deep Dielectric Charging Induced by Dielectric Temperature and Energetic Electrons</b> .....	239
<i>S. Li, D. Min, M. Lin, W. Li, J. Li</i>	
<b>B2-21 The Effect of CaCO<sub>3</sub>-doping on the Structural and Dielectric Properties of TiO<sub>2</sub></b> .....	243
<i>M. D. Athanassopoulou, J. A. Mergos, C. T. Dervos</i>	
<b>B2-22 The Effect of Nano-ZnO on Withstanding Corona Aging in Low-Density Polyethylene</b> .....	247
<i>S. Chen, R. Huang, Z. Peng, X. Wang, X. Cheng</i>	
<b>B2-23 DC Conduction Mechanisms in Epoxy Nanocomposites under the Humid Environment</b> .....	251
<i>C. Zou, J. C. Fothergill, S. Zhang, X. Zhou</i>	
<b>B2-24 Influence of Nanofillers on Electrical Characteristics of Epoxy Resins Insulation</b> .....	255
<i>Q. Wang, G. Chen, A. S. Alghamdi</i>	
<b>B2-25 Influence of Temperature on Dielectric Properties of PA-12/CNT Composites</b> .....	259
<i>S. Versavaud, G. Regnier, M. Vincent</i>	
<b>B2-26 On Surface Degradation Mechanisms of Epoxy filled with Silica Nanoparticles caused by Partial Discharges</b> .....	263
<i>C. Hoffmann, F. Jenau</i>	
<b>B2-27 An Experimental Study about Electrical Treeing inside LDPE Nanocomposites</b> .....	267
<i>F. Guastavino, A. Dardano, S. Squarcia, P. Tiemblo, J. Guzman, N. Garcia</i>	
<b>B2-28 Effects of Addition of Nano-scale Alumina and Silica Fillers on Thermal Conductivity and Dielectric Strength of Epoxy / Alumina Microcomposites</b> .....	271
<i>Y. Okazaki, M. Kozako, M. Hikita, T. Tanaka</i>	
<b>B2-29 Investigation of Composite Insulators with Microvaristor Filled Silicone Rubber Components</b> .....	275
<i>J. Debus, V. Hinrichsen, J. M. Seifert, M. Hagemeister</i>	
<b>B2-30 Dielectric Properties of Isotactic Polypropylene and Montmorillonite Nanocomposites</b> .....	279
<i>E. Izci, N. Bowler</i>	
<b>B2-31 Giant Permittivity in Three-phase PVDF Composites</b> .....	283
<i>Z. Ghallabi, M. Arous, A. Kallel, I. Royaud, G. Boiteux, G. Seytre</i>	
<b>B2-32 Electrical Extractions of 1-D Doping Profiles and Effective Mobility in MOSFET</b> .....	286
<i>H. Park, B. Choi</i>	
<b>B3-0 Dielectric Behaviour of BaTiO<sub>3</sub> / P(VDF-HFP) Composite Thin Films Prepared by Solvent Evaporation Method</b> .....	289
<i>M. Aldas, G. Boiteux, G. Seytre, Z. Ghallabi</i>	
<b>B3-1 Space Charge Behavior on Epoxy Based Dielectrics Filled with Micro and Nano Silica</b> .....	293
<i>J. Castellon, S. Agnel, A. Toureille, M. F. Fréchette, S. Savoie, A. Krivda, L. E. Schmidt</i>	
<b>B3-2 The Influence of Moisture on the Electrical Performance of XLPE/Silica Nanocomposites</b> .....	297
<i>L. Hui, J. K. Nelson, L. S. Schadler</i>	
<b>B3-3 Fast Pulse-like Conduction in XLPE Based Materials Detected through Charging Current Measurements</b> .....	301
<i>D. Fabiani, G. C. Montanari, L. A. Dissado</i>	

## **ELECTRETS AND SPACE CHARGE**

<b>C1-0 The New International Center for Dielectrics Research at Xi'an Jiaotong University: Recent Activities and Results</b> .....	305
<i>W. Ren, Y. Xi</i>	

<b>C1-1 Fabrication and Piezoelectricity of Fluoropolymer Films with Patterned Structure</b> .....	309
<i>X. Zhang, G. Cao, Z. Sun, Z. Xia, C. Zeng, C. Zhang, B. Wang</i>	
<b>C1-2 Dielectric Resonance Spectroscopy of Piezoelectrets with Tubular Channels: Channel Dimensions Control Resonances</b> .....	313
<i>R. A. P. Altafim, W. Wirges, X. Qiu, R. Gerhard, H. C. Basso, R. A. C. Altafim, W. Jenninger, J. Wagner</i>	
<b>C1-3 A Novel Method for Distribution of Trap Levels in Dielectric by Photo-stimulated Discharge</b> .....	317
<i>Z. Zhu, Y. Zhang, Z. An, F. Zheng</i>	
<b>C1-4 Space Charge Accumulation and Induced Mechanical Deformation in Organic Insulator Films</b> .....	321
<i>T. Tran Anh, L. Berquez, L. Boudou, J. Martinez-Vega</i>	
<b>C1-5 Specific Heat of a Ferroelectric PZT Ceramic at the Morphotropic Phase Boundary</b> .....	325
<i>S. B. Lang, J. C. Lashley, K. A. Modic, R. A. Fisher, W. M. Zhu, Z. G. Ye</i>	
<b>C2-1 Effect of Temperature Gradient on Space Charge Accumulation at Applied Voltage Reversal in LDPE Film</b> .....	328
<i>K. Wu, X. Chen, X. Wang, Z. Wang, Y. Cheng, Z. Peng</i>	
<b>C2-2 The Effect of Temperature Gradient on Space Charge Accumulation at SR/XLPE Interface under DC Stress</b> .....	332
<i>X. Wang, M. Zheng, X. Chen, Z. Peng, K. Wu, S. Liu, J. Peng, S. Chen</i>	
<b>C2-3 Dielectric Properties and Space Charge Behavior of MgO-Epoxy Nanocomposites</b> .....	336
<i>T. Andritsch, R. Kochetov, P. H. F. Morshuis, J. J. Smit</i>	
<b>C2-4 Piezoelectric Sensor Based on Electrets Thermoforming Technology</b> .....	340
<i>D. R. Falconi, R. A. C. Altafim, H. C. Basso, R. A. P. Altafim, W. Wirges, R. Gerhard</i>	
<b>C2-5 Detection of Electrochemical Migration Growth along the Thickness Direction in a Paper/phenol-resin Composite</b> .....	343
<i>H. Asakawa, M. Natsui, Y. Ohki, T. Tanaka, T. Maeno, K. Okamoto</i>	
<b>C2-6 Investigations on Charge Accumulation and Relaxation in Polycrystalline Al<sub>2</sub>O<sub>3</sub></b> .....	347
<i>P. Molinié, S. Agnel, J. Castellon</i>	
<b>C2-7 Study on Electrical Properties of Cell Suspension by the Pressure Wave Propagation Method</b> .....	351
<i>L. Cheng, L. Zhong, Y. Zhang, J. Chen</i>	
<b>C2-8 Evaluation of Energy Depth of Traps in PA/BaTiO<sub>3</sub> Composite Film by TSC Measurements</b> .....	355
<i>M. Yoshiura, F. Yoshida</i>	
<b>C2-9 Polarization and Depolarization Current Measurements of Oil Impregnated Paper Insulation System under Thermal Runaway</b> .....	359
<i>I. Fofana, H. Hemmatjou, M. Farzaneh, E. Gockenbach, H. Borsi</i>	
<b>C2-10 Fluorinated Cellular Polypropylene Films with Time-Invariant Deep Charge Traps Obtained by Post-Treatments</b> .....	363
<i>M. Mao, Z. An, J. Yao, Y. Zhang, Z. Xia</i>	
<b>C2-11 Packet-like Space Charge Dynamics in Polyethylene with Various Crystallinity</b> .....	367
<i>F. Zheng, H. Zhao, J. Xia, Y. Zhang</i>	
<b>C2-12 Blocking Effect of PVF on Space Charge Injection into Low Density Polyethylene</b> .....	371
<i>J. Xia, Y. Zhang, Z. An, F. Zheng</i>	
<b>C2-13 Influence of Thermal Treatment on the Charge Stability of Non-Porous and Porous Polytetrafluoroethylene (PTFE) film electrets</b> .....	375
<i>X. Qiu, Z. Xia, F. Wang, W. Wirges, R. Gerhard</i>	
<b>C2-14 Electret Properties of Polymer Films and Fiber Materials Modified by Phosphorus Trichloride</b> .....	379
<i>V. A. Golade, A. A. Rychkov, D.A. Rychkov</i>	
<b>C2-15 Investigation of Charge Trapping in Thin Kapton® Polyimide Films by means of Photo-stimulated Discharge Spectroscopy</b> .....	382
<i>N. Kozhevnikova, R. Gerhard, A. Mellinger</i>	
<b>C2-16 Nonlinear Conductivity of Ion-Complexed Polyethylene Oxide</b> .....	386
<i>S. Hahne, K. Yoshida, T. Furukawa, B. Ploss</i>	
<b>C2-17 An Improved Pulsed Electroacoustic System for Space Charge Measurement under AC Conditions</b> .....	390
<i>Z. Xu, J. Zhao, G. Chen</i>	
<b>C2-18 Influence of Uniaxial Stretching Rate and Electric Poling on Crystalline Phase Transitions from Nonpolar to Polar in Poly(vinylidene fluoride) Films</b> .....	394
<i>F. Wang, P. Frübing, R. Gerhard</i>	
<b>C2-19 Charging Property and Charge Trap Parameters in Porous Polypropylene Film using Thermally Stimulated Current</b> .....	398
<i>F. Yoshida, M. Yoshiura</i>	
<b>C2-20 Influence of Lateral Currents on Capacitance Spectra of Organic Metal-Insulator-Semiconductor Structures with a Ferroelectric Insulator</b> .....	402
<i>R. Kalbitz, P. Frübing, R. Gerhard, M. Taylor</i>	

<b>C2-21 Relation Between Dielectric and Mechanical Losses in Ferroelectric Poly(vinylidene fluoride-hexa fluoropropylene) Films</b> .....	406
<i>P. Frübing, F. Wang, C. Günter, R. Gerhard, M. Wegener, M. Jaunich, W. Stark</i>	
<b>C2-22 Study of Dielectric Parameters of Polyvinyl Fluoride (PVF) by the Thermostimulated Currents (TSC) Method</b> .....	410
<i>M. W. Khemici, N. Doulache, A. Gourari, M. Bendaoud</i>	
<b>C2-23 Polarization Fatigue in Cellular-polypropylene Ferroelectrets during Dielectric-barrier Discharges</b> .....	414
<i>X. Qiu, M. Sborikas, W. Wirges, R. Gerhard</i>	

## **DIAGNOSTICS AND EXPERIMENTS**

<b>D1-0 Terahertz Spectroscopy and Imaging for Material Analysis in Conservation Science</b> .....	418
<i>K. Fukunaga, I. Hosako, M. Picollo</i>	
<b>D1-1 Time-Scale Analysis of the Applied Voltage Waveform in Uniform Pollution Conditions as a New Monitoring Technique of the Insulator Flashover</b> .....	422
<i>M. A. Douar, A. Mekhaldi, M. C. Bouzidi</i>	
<b>D1-2 Practical Experiences with On-line PD Monitoring and Interpretation for MV Cable Systems</b> .....	426
<i>S. M. Gargari, P. A. A. F. Wouters, P. C. J. M. van der Wielen, E. F. Steennis</i>	
<b>D1-3 Investigations of Diagnostic Tools for Insulation Systems of High Voltage Rotating Machines</b> .....	430
<i>E. Gockenbach, M. Farahani, H. Borsi</i>	
<b>D1-4 Contribution to Improving the Spatial Resolution of a Pulsed Electro Acoustic Cell Measurement – An Analysis of Acoustic Waves Propagation</b> .....	434
<i>M. Arnaout, L. Berquez, F. Baudoin, D. Payan</i>	
<b>D1-5 Terahertz Spectroscopy – A Powerful Tool for the Characterization of Plastic Materials</b> .....	438
<i>S. Wietzke, C. Jansen, N. Krumbholz, O. Peters, N. Vieweg, C. Jördens, M. Scheller, D. Romeike, T. Jung, M. Reuter, S. Chatterjee, M. Koch</i>	
<b>D1-6 Sandwiched Porous Polytetrafluoroethylene Ferroelectrets: The Piezoelectric <math>d_{33}</math> Coefficient</b> .....	442
<i>H. von Seggern, S. Zhukov</i>	
<b>D2-1 Laser Ablation of Polymeric Composites</b> .....	447
<i>I. L. Hosier, M. S. Abd Rahman, E. W. Westenbrink, A. S. Vaughan</i>	
<b>D2-2 Discrete Wavelet Transform Analysis under Non-Uniform Contaminated Conditions for Pollution Severity Estimating</b> .....	452
<i>M. A. Douar, A. Mekhaldi, M. C. Bouzidi</i>	
<b>D2-3 Applicability of Positron Annihilation Spectroscopy to Evaluation of Polymer Materials</b> .....	456
<i>T. Kurihara, T. Takahashi, H. Homma, T. Okamoto, K. Dohi</i>	
<b>D2-4 Measurement of Corona Discharge on Polymer Insulator through the UV Rays Sensor including Optical Lens</b> .....	460
<i>Y. Kim, K. Shong</i>	
<b>D2-5 Experimental and Numerical Analyses of Molecular Vibrations in Amorphous and Crystalline Poly lactide at Terahertz Frequencies</b> .....	464
<i>N. Fuse, R. Sato, K. Itoh, Y. Ohki, M. Mizuno, K. Fukunaga</i>	
<b>D2-6 Partial Discharge Characteristics of Enameled Wire of Electric Machine Winding under Exploitation Stresses</b> .....	468
<i>B. Florkowska, J. Roehrich, P. Zydron, M. Florkowski</i>	
<b>D2-7 Separation of Multiple Sources in PD Measurements Using an Amplitude-Frequency Relation Diagram</b> .....	472
<i>N. Kuljaca, S. Meregalli, A. Contin, A. Ukovich</i>	
<b>D2-8 Localization of Turn-to-Turn Fault in Transformers Using Artificial Neural Networks and Winding Transfer Function</b> .....	476
<i>M. Faridi, M. Kharezi, E. Rahimpour, H. R. Mirzaei, A. Akbari</i>	
<b>D2-9 Frequency Response Analysis - Low Frequency Characteristics and Fault Diagnosis on Power Transformers</b> .....	480
<i>H. Firoozi, M. Kharezi, N. Mahmoodi, M. I. Ghayasi</i>	
<b>D2-10 Relevance of Phase Resolved PD Analysis to Insulation Diagnosis in Industrial Equipment</b> .....	484
<i>G. C. Stone</i>	
<b>D2-11 Study of the Generation of the Pressure Pulse in the Laser Induced Pressure Pulse Method: Optimization of the Process</b> .....	489
<i>H. Tran Van, J.-L. Augé, P. Rain</i>	
<b>D2-12 Analysis of Three-phase Partial Discharge Signals</b> .....	493
<i>J. A. Hunter, L. Hao, D. J. Swaffield, P. L. Lewin, N. Cornish, C. Walton, M. Michel</i>	

<b>D2-13 Interpretation of Partial Discharge Activity in the Presence of Harmonics</b> .....	497
<i>S. Bahadoorsingh, S. M. Rowland, V. M. Catterson, S. E. Rudd, S. D. J. McArthur</i>	
<b>D2-14 Partial Discharges in Aluminum Nitride Ceramic Substrates</b> .....	501
<i>T. A. T. Vu, J.-L. Augé, O. Lesaint, M. T. Do</i>	
<b>D2-15 Influence of Impregnating Liquids on Dielectric Response of Impregnated Cellulose Insulation</b> .....	505
<i>A. Graczkowski, J. Gielniak</i>	
<b>D2-16 Acoustic Method in Diagnostics of Transformer Insulating</b> .....	509
<i>E. Müllerova</i>	
<b>D2-18 Partial Discharge Defects Classification Using Neuro-Fuzzy Inference System</b> .....	513
<i>M. A. Fard, A. Akbari, R. Shojaee, H. R. Mirzaei, P. Naderi</i>	
<b>D2-19 Partial Discharges in High-voltage Insulation of Turbogenerators</b> .....	517
<i>J. Klasna, P. Martínek, R. Fanta, J. Pihera</i>	
<b>D2-20 Effects of Statistical Characteristics of the Output Voltage in Compact Marx Generator on Insulation Test Results</b> .....	521
<i>A. R. Kazemi, K. Niayesh, A. A. Shayegani</i>	
<b>D2-21 Piezoelectrets from Sandwiched Porous polytetrafluoroethylene Films with Different Porosity</b> .....	525
<i>S. Zhukov, H. von Seggern</i>	
<b>D2-22 Diagnostics and Experiments on Dielectric Properties Using Time Domain Reflectometry (TDR)</b> .....	529
<i>A. Mériem, S. Achour, G. Chafik</i>	

## **THEORIES, METHODS AND MODELS**

<b>E1-0 Influence of High Field and Molecular Effects on Some Electrical Properties of Polymers</b> .....	533
<i>J.-P. Crine</i>	
<b>E1-1 Numerical Modeling of Surface Potential Decay of Corona Charged Polymeric Material</b> .....	537
<i>G. Chen, J. Zhao, Y. Zhuang</i>	
<b>E1-2 Patterns of Partial Discharge Activity in XLPE: From Inception to Breakdown</b> .....	541
<i>L. Wang, A. Cavallini, G. C. Montanari, L. Testa</i>	
<b>E1-3 Conductivity and Space Charge in LDPE/BaSrTiO<sub>3</sub> Nanocomposites</b> .....	545
<i>R. J. Fleming, A. Ammala, P. S. Casey, S. B. Lang</i>	
<b>E2-1 Modelling of Cycle to Cycle Behaviour for Partial Discharge Events within a Spherical Cavity in a Solid Dielectric Material by Using Finite Element Analysis</b> .....	549
<i>H. A. Illias, G. Chen, P. L. Lewin</i>	
<b>E2-2 Numerical Modeling of Space Charge in Polyethylene under AC Fields</b> .....	553
<i>J. Zhao, Z. Xu, G. Chen, P. Lewin</i>	
<b>E2-3 Connection between Disorder in Morphology and Stochastic Nature of Electrical Breakdown in Insulating Polymers</b> .....	557
<i>K. Wu, Y. Wang, Y. Cheng, L. A. Dissado</i>	
<b>E2-4 Measurement and Modelling of Partial Discharge Behaviour in a Spherical Cavity within a Solid Dielectric Material as a Function of Cavity Diameter</b> .....	561
<i>H. A. Illias, G. Chen, P. L. Lewis</i>	
<b>E2-5 Remaining Lifetime Modelling of Power Transformers on Individual and Population Level</b> .....	565
<i>P. Wouters, A. van Schijndel, J. Wetzer</i>	
<b>E2-6 Biaxial Stretching of Rubber Plates under Normal Electric Fields – Bifurcation in Rubber Plates</b> .....	569
<i>R. Díaz-Calleja, M. J. Sanchis, E. Riande</i>	
<b>E2-7 An Experimental Review on Application of Wavelet Transform on Partial Discharge Evaluation of Power Transformers</b> .....	573
<i>H. R. Mirzaei, A. Akbari, M. Allabakhshi, M. Kharezi</i>	
<b>E2-8 A Method Based on Analytical Hierarchy Process for Generator Fault Diagnosis</b> .....	577
<i>M. Z. Ernani, A. A. Azirani</i>	
<b>E2-9 Frequency Method for Identification of Resonance Overvoltages in Transformer Windings</b> .....	581
<i>M. Florkowski, J. Furgal, P. Pająk</i>	
<b>E2-10 Method to Distinguish between Space-Charge and Dipolar Relaxation in the TSDC Spectra of Polyethylene Electrical Insulation</b> .....	585
<i>J. Örrit, J. C. Cañadas, J. Sellarès, J. Belana</i>	
<b>E2-11 Suggesting an Agent Based Design Methodology for Condition Monitoring of High Voltage Apparatus</b> .....	589
<i>R. Shojaee, A. Akbari, M. A. Fard, M. Allabakhshi</i>	
<b>E2-15 A Correlation Based Approach to Interference Suppression from Phase Resolved Partial Discharge Patterns</b> .....	593
<i>B. Barkat, H. Al-Marzouqi</i>	

<b>E2-16 The Density Based Segmentation Algorithm for Interpreting Partial Discharge Data</b> .....	597
<i>H. Al-Marzouqi</i>	
<b>E3-0 Dynamic Nonlinear Susceptibility in Solid Dielectrics</b> .....	600
<i>J. Dec, S. Miga, W. Kleemann</i>	
<b>E3-1 Electron Resonance-Tunneling, Negative Differential Resistance and Positive Packet Formation in Polyethylene</b> .....	605
<i>T. J. Lewis, J. P. Llewellyn</i>	
<b>E3-2 Efficiency Improvement for Data-processing of Partial Discharge Signals Using Parallel Computing</b> .....	609
<i>G. Luo, D. Zhang</i>	
<b>E3-3 Comparison of the Two-power-law Generalized Mittag-Leffler and Havriliak-Negami Dielectric Relaxation Responses</b> .....	613
<i>J. Trzmiel, A. Jurlawicz, M. Teuerle</i>	

## **CONDUCTING AND TREEING**

<b>F1-0 The Origin and Nature of ‘Charge Packets’. A Short Review</b> .....	617
<i>L.A. Dissado</i>	
<b>F1-1 Electric Strength and Dielectric Properties of <math>\mu\text{m}</math>-Polymer-Films</b> .....	623
<i>S. Konzelmann, D. Peier</i>	
<b>F1-2 A Novel View at Electrode Polarization</b> .....	627
<i>B. Martin, H. Kliem</i>	
<b>F1-3 On the Transport of Potassium Ions through Borosilicate Glass – A Combined Experimental and Theoretical Study</b> .....	631
<i>M. Schäfer, K. Lange, N. Rohman, A. Schlemmer, H. Staesche, B. Roling, K.-M. Weitzel</i>	
<b>F1-4 The Influence of Strain on Water Treeing in XLPE Power Cables</b> .....	635
<i>S. Nordås, E. Ildstad</i>	
<b>F1-5 Partial Discharge Patterns in Conducting and Non-Conducting Electrical Trees</b> .....	639
<i>S. J. Dodd, N. M. Chalashkanov, J. C. Fothergill</i>	
<b>F1-6 Influence of Absorbed Water on Volume Resistivity of Epoxy Resin Insulators</b> .....	643
<i>B. Lutz, J. Kindersberger</i>	
<b>F2-1 The Influence of Water Trees on Permittivity and Loss Factor of Medium Voltage Cables Polyethylene Insulation</b> .....	647
<i>P. V. Notingher, M. Ploeanu, S. Grigorescu, C. Stancu</i>	
<b>F2-2 Study on Propagation Characteristics and Analysis of Partial Discharges for Electrical Treeing in XLPE Power Cables</b> .....	651
<i>T. Zhou, L. Liu, R. Liao, G. Chen</i>	
<b>F2-3 The Impact of Different Alkali Ion Concentrated Hollow Glass Microspheres on the Electrical Breakdown Mechanism of Syntactic Foam</b> .....	655
<i>A. Mashkin, A. Strauchs, A. Schnettler, A. Lunding</i>	
<b>F2-4 Continuous Monitoring of Dielectric Properties of LDPE Samples during Electrical Treeing</b> .....	659
<i>B. Sonerud, J. Blennow, S. Gubanski, S. Nilsson, T. Bengtsson</i>	
<b>F2-5 Effect of Temperature on Electrical Tree in Silicone Rubber</b> .....	663
<i>B. X. Du, Z. L. Ma, Y. Gao, T. Han</i>	
<b>F2-6 Temperature Gradient Effect on the Conductivity of an XLPE Insulated Polymeric Power Cable</b> .....	667
<i>W. Choo, G. Chen, S. G. Swingler</i>	
<b>F2-7 Breakdown Strength of Solid/Solid Interface</b> .....	671
<i>S. M. Hasheminezhad, E. Ildstad, A. Nysveen</i>	
<b>F2-8 Effect of Cross-linking Temperature on Charge Decay Behavior in XLPE</b> .....	675
<i>Y. Gao, B. X. Du, Z. L. Ma, X. H. Zhu</i>	
<b>F2-9 Thermo-stimulated Depolarization Currents in Polyethylene Films. Numerical Simulations and Experiments</b> .....	679
<i>S. Le Roy, F. Baudoin, L. Boudou, C. Laurent, G. Teyssède</i>	
<b>F2-11 Dielectric Breakdown Characteristics of Alumina</b> .....	683
<i>F. Talbi, F. Lalam, D. Malec</i>	
<b>F2-12 Electrical Tree Growth in Extruded s-Polypropylene</b> .....	687
<i>J. Holto, E. Ildstad</i>	
<b>F2-13 The Study of the Molecular Movements in the Range of Glass Transition by the Final Thermally Stimulated Discharge Current Technique</b> .....	691
<i>E. R. Neagu, C. J. Dias, M. C. Lança, R. Igreja, P. Inácio, J. N. Marat-Mendes</i>	

<b>F2-14 Propagation of Electrical Tree Growth in a Composite Solid Insulation Consisted of Epoxy Resin and Mica Sheets: Simulation with the Aid of Cellular Automata</b> .....	695
<i>D. D. Christantoni, G. E. Vardakis, M. G. Danikas</i>	
<b>F2-15 Electrical Tree Growth Simulation in Nanocomposite Polymers: The Role of Nanoparticles and Homocharges</b> .....	699
<i>D. Pitsa, G. E. Vardakis, M. G. Danikas</i>	
<b>F2-16 Electrical Tree Simulation and Breakdown in Nanocomposite Polymers: The Role of Nanoparticles</b> .....	702
<i>D. Pitsa, G. E. Vardakis, M. G. Danikas, Y. Chen</i>	
<b>F2-17 On the Width of the Thermally Stimulated Discharge Current Peak</b> .....	705
<i>E. R. Neagu, C. J. Dias, M. C. Lança, R. Igreja, P. Inácio, J. N. Marat-Mendes</i>	
<b>F2-19 Effect of A-Site (Ba<sup>2+</sup>) and B-Site (Zr<sup>4+</sup>) Substitution on Structure, Dielectric Spectroscopy Parameters on Na<sub>0.5</sub>Bi<sub>0.5</sub>TiO<sub>3</sub> Based Relaxor Ferroelectric Ceramic Exhibiting Morphotropic Phase Boundary</b> .....	709
<i>K. S. Rao, B. Tilak. K. C. V. Rajulu, A. Swathi, H. Workineh</i>	
<b>F2-20 Partial Discharges of Solid Insulation in Different Insulating Fluids</b> .....	713
<i>V. Mentlik, J. Pihera, M. Širuček, P. Trnka, P. Prosr, R. Polanský, P. Martinek</i>	
<b>F2-22 Preparation and Evaluation of Epoxy Composite Insulating Materials toward High Thermal Conductivity</b> .....	717
<i>M. Kozako, Y. Okazaki, M. Hikita, T. Tanaka</i>	

## **NEW OR FLEXIBLE MATERIALS AND INSULATING SYSTEMS, BIODIELECTRICS**

<b>G1-0 Flexible and Stretchable Dielectrics</b> .....	721
<i>S. Bauer</i>	
<b>G1-1 Optimized Energy Harvesting Based on Electro Active Polymers</b> .....	725
<i>C. Graf, J. Maas, D. Schapeler</i>	
<b>G1-2 Electro-deformation of Individual Mammalian Cells in Suspension</b> .....	730
<i>L. A. MacQueen, M. M. Thibault, M. D. Buschmann, M. R. Wertheimer</i>	
<b>G1-3 Charge Injection Behaviors of Surface Oxyfluorinated Linear Low Density Polyethylene</b> .....	734
<i>Y. Jiang, Z. An, C. Liu, F. Zheng, Y. Zhang</i>	
<b>G2-1 Electrical Breakdown in Soft Elastomers: Stiffness Dependence in Un-pre-stretched Elastomers</b> .....	738
<i>M. Kollosche, H. Stoyanov, H. Ragusch, S. Risse, A. Becker, G. Kofod</i>	
<b>G2-2 Optical Transmission Gratings Tuned by Electro Active Polymers</b> .....	742
<i>M. Kollosche, G. Kofod, S. Döring, N. Hildebrandt, J. Stumpe</i>	
<b>G2-3 Nano-scale Materials Science for Soft Dielectrics: Composites for Dielectric Elastomer Actuators</b> .....	746
<i>G. Kofod, H. Stoyanov, M. Kollosche, S. Risse, H. Ragusch, D. Rychkov, M. Dansachmüller, D. McCarthy</i>	
<b>G2-4 Electric Field Pulse Sterilization of Liquid Food</b> .....	750
<i>Y. Oka, Y. Muramoto, N. Shimizu, S. Ichihara</i>	
<b>G2-5 Acceleration of Plant Growth by D.C. Electric Field</b> .....	754
<i>T. Okumura, Y. Muramoto, N. Shimizu</i>	
<b>G2-6 Dielectric Properties of Red Blood Cells Suspensions Based on Broadband Dielectric Spectrum</b> .....	758
<i>Y. Zhang, L. Zhong, S. Tan, C. Xu</i>	
<b>G2-7 Effect of Applied Electric Field on the Formation and Structure of Ice in Biomaterials during Freezing</b> .....	762
<i>Y. Ma, L. Zhong, H. Zhang, C. Xu</i>	
<b>G2-8 Simulation Model for Electro Active Polymer Generators</b> .....	766
<i>C. Graf, M. Aust, J. Maas, D. Schapeler</i>	
<b>G2-9 Effects of Elastomers Modified with Polar Molecules on Water Tree Resistance of Cross-linked Polyethylene</b> .....	770
<i>X. Huang, F. Liu, J. Yang, P. Jiang</i>	
<b>G2-10 Dielectric Layers with Gradual Properties</b> .....	774
<i>K. Makasheva, B. Despax, L. Boudou, G. Teyssedre, L. Ressler, P. Pons</i>	
<b>G2-11 Low Frequency Nonlinearity in Layered Ferroelectrics BaBi<sub>2</sub>Nb<sub>2</sub>O<sub>9</sub> and SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub></b> .....	778
<i>K. Bormanis, A. Kalvane, A. I. Burkhanov, Y. V. Kochergin</i>	
<b>G2-12 Force Relaxation in Charged Dielectric Elastomer Actuators</b> .....	781
<i>D. Rychkov, M. Dansachmüller, H. Ragusch, A. Becker, G. Kofod</i>	
<b>G2-14 New Organic Insulation Structure to Improve the Surface Flashover Characteristics in Vacuum</b> .....	784
<i>S. Li, Q. Huang, T. Zhang, F. Ni, J. Li</i>	

<b>G2-15 Towards Intelligent Insulation Technologies .....</b>	<b>788</b>
<i>A. F. Holt, A. C. Topley, R. C. D. Brown, P. L. Lewin, A. S. Vaughan, P. Lang</i>	
<b>G3-0 The Unexplored Avenues of Human Skin; Electromagnetic Properties in the Sub THz Band .....</b>	<b>792</b>
<i>P. B. Ishai, Y. Feldman, A. Puzenko, A. Caduff, A. J. Agranat</i>	
<b>G3-1 The Effect of Different Type of Crosslinks on Electrical Properties on Crosslinked Polyethylene .....</b>	<b>796</b>
<i>S. Nilsson, T. Hjertberg, A. Smedberg</i>	
<b>G3-2 Enhancing the Permittivity, Thermal Conductivity and Mechanical Strength of Elastomer Composites by Using Surface Modified BaTiO<sub>3</sub> Nanoparticles .....</b>	<b>800</b>
<i>X. Huang, L. Xie, P. Jiang, F. Liu</i>	
<b>Author Index</b>	