

2008 13th International Symposium on Electrets

(ISE 13)

**Tokyo, Japan
15 – 17 September 2008**



**IEEE Catalog Number: CFP08ELT-PRT
ISBN: 978-1-4244-1850-3**

TABLE OF CONTENTS

ORAL PRESENTATIONS

Charges and Polarization in Insulators, a Long History with a Promising Future	1
<i>J. Lewiner</i>	
Physical-Organic Studies of Ionic Electrets: Mechanism of Formation, Molecular Design, and Applications	2
<i>G.M. Whitesides, S.W. Thomas III, M. Reches</i>	
Printed Organic Nonvolatile Memory for Skin-like Large-area Interfaces	3
<i>T. Someya, T. Sekitani, K. Zaito, M. Takamiya, T. Sakurai</i>	
Ferroelectric Nanostructures	4
<i>I. Vrejoiu, M. Alexe, D. Hesse, W. Lee, U. Goesele</i>	

SESSION 1: FERROELECTRETS, PHOTOELECTRETS AND BIOELECTRETS I

Increased Piezoelectric d_{33}-coefficients of Ferroelectrets with High External DC-voltages	5
<i>J. Hillenbrand, G.M. Sessler</i>	
In-situ Acoustical Monitoring of the Effective-Polarization Hysteresis in Cellular Polypropylene Ferroelectrets	6
<i>X. Qiu, A. Mellinger, R. Gerhard</i>	
New Techniques for the Development of Cellular Films for Electret and Piezoelectric Applications	7
<i>N. Behrendt, V. Altstadt, X. Zhang, G. Sessler, H.W. Schmidt</i>	
Nanomodified Thermally More Durable Cellular Electromechanical Films from PP/POSS, PP/COC/POSS and COC/POSS Compounds	8
<i>M. Paajanen, M. Karttunen, S. Kortet</i>	
Study on Piezoelectric Properties of Fluorinated Polypropylene Ferroelectrets by Fluorine Gas	9
<i>Z. An, M. Zhao, J. Yao, Y. Zhang, Z. Xia</i>	
Evaluation of Pharmacodynamics of Porous PTFE/PE/PP Electret Meloxicam Patch	10
<i>J. Jiang, X.M. Hou, G.D. Li, Y.X. Kong, L. Chen, L.L. Cui</i>	

SESSION 2: FERROELECTRETS, PHOTOELECTRETS AND BIOELECTRETS II

Turning Polymer Foams into Piezoelectric Sensors: Optical and Acoustic Studies of Dielectric Barrier Discharges in Ferroelectrets	11
<i>A. Mellinger, X. Qiu, R. Gerhard</i>	
Electrical and Biological Properties of Polarized Hydroxyapatite Electrets	12
<i>Y. Tanaka, M. Nakamura, W. Wang, A. Nagai, K. Yamashita</i>	
Development of High-performance Perfluorinated Polymer Electret	13
<i>Y. Sakane, Y. Suzuki, N. Kasagi</i>	
Effects of Polar Molecules on the Electret Properties of Cyclic Olefin Copolymers (COC)	14
<i>W.C. Ko, J.L. Chen, W.J. Wu, A.S.Y. Lee, C.K. Lee</i>	

SESSION 3: NANOSCALE MEASUREMENTS AND MATERIALS

Electromechanical Imaging of Biological Systems with Sub-10 nm Resolution	15
<i>S.V. Kalinin, S. Jesse, B.J. Rodriguez</i>	
Characterization of Semiconducting Structures by the PWP Method	16
<i>S. Hole, J. Lewiner</i>	
Polarity Formation in Molecular Crystals Studied by Scanning Pyroelectric Microscopy	17
<i>M. Wubbenhorst, N.R. Behrnd, G. Couderc, J. Hulliger</i>	

SESSION 4: NANOSCALE MEASUREMENTS AND MATERIALS

Application Oriented R&D of MEMS (Micro Electro Mechanical Systems) by Open Collaboration	18
<i>M. Esashi</i>	
Enhanced Ferroelectric and Piezoelectric Responses in Modified Poly(vinylidene fluoride) Polymers and Nanocomposites	19
<i>B. Chu, B. Neese, X. Zhou, Q. Chen, Q.M. Zhang</i>	
High Throughput Epitaxy of Ferroelectric PVDF-TrFE Thin Films on Molecularly Ordered PTFE Surface for Non-volatile Polymer Memory	20
<i>Y.J. Park, S.J. Kang, B. Lotz, M. Brinkmann, C. Park</i>	
Ferroelectric Polymer Nano-Flake Crystal: Effect of Counter Charge	21
<i>N. Takahashi, M. Hikosaka</i>	

SESSION 5: FERROELECTRIC, PIEZOELECTRIC AND PYROELECTRIC PHENOMENA I

Why are Ferroelectric Polymers Difficult to Find – And Difficult to Verify	22
<i>S. Ducharme</i>	
Basic Study of Controlling Piezoelectric Motion of Chiral Polymeric Fiber	23
<i>M. Nakayama, M. Sawano, M. Ueneka, K. Morii, M. Honda, K. Yamamoto, Y. Tajitsu</i>	
PZT / P(VDF-HFP) 0-3 Composites: Preparation, Electrical Poling and Piezoelectric Properties	24
<i>K. Arlt, M. Wegener</i>	

SESSION 6: FERROELECTRIC, PIEZOELECTRIC, AND PYROELECTRIC PHENOMENA II

Dipole Polarization of Polypropylene Electret	25
<i>Y. Saito, Y. Matsuda, S. Tasaka</i>	
Interrelation Between Pyroelectricity, Polarization and Charge in PVDF	26
<i>H. Von Seggern, S.N. Fedosov</i>	
Effects of Free Carriers in Device with Ferroelectric Polymer P(VDF-TrFE) and Organic Semiconductor Interface	27
<i>C.A. Nguyen, S.G. Mhaisalkar, P.S. Lee</i>	
Limiting Switching Characteristics of VDF/TrFE Copolymer Thin Films	28
<i>T. Nakajima, Y. Takahashi, S. Okamura, T. Furukawa</i>	

The Space Charge and Polarization of Ferroelectric Polymers	29
<i>V.V. Kochervinskii, D.V. Vorobyev, A.Y. Khnykov</i>	

SESSION 7: CHARGE INJECTION, TRANSPORT AND TRAPPING

Electrical Conductivity in LDPE Containing Nanosized Barium Strontium Titanate Particles	30
<i>R.J. Fleming, A. Ammala, P.S. Casey, S.B. Lang</i>	
Use of Dynamic Space Charge Measurements to Differentiate Charge Injection and Ionic Dissociation in Polypropylene	31
<i>F. Zheng, G. Teysedre, C. Laurent, C. Thomas, M. Hoyos, Y. Zhang</i>	
Charge Storage of Compact and Fibrous Blends Based on Polyphenylene Ether	32
<i>D. Lovera, V. Altstadt, H.W. Schmidt</i>	
Charge Decay of Electron-beam Irradiated Polypropylene Films Containing Additives	33
<i>T. Motz, J. Hillenbrand, X. Zhang, N. Behrendt, C. Von Salis-Soglio, D.P. Erhard, V. Altstadt, H.W. Schmidt, G.M. Sessler</i>	
A Monte Carlo Method of Analysis of LImm Data Yielding More Accurate Electric Field Profiles	34
<i>S.B. Lang, R. Fleming, A. Mellinger</i>	
The Barrier Height for Electron Injection/Extraction at Metal-dielectric Interface	35
<i>E.R. Neagu, R.M. Neagu, C.J. Dias, M.C. Lanca, J.N. Marat-Mendes</i>	

SESSION 8: TSC I

Thermally Stimulated Currents and Dielectric Relaxation Study of Vegetal Polymers	36
<i>E. Dantras, G. Jafarpour, H. Hoyet, A. Boudet, C. Lacabanne</i>	
Analysis of AC Permittivity Response Measured in Ionic Glasses: a Comparison Between Iso and Non-Iso Thermal Experimental Conditions	37
<i>F. Henn, G. Garcia-Belmonte, J. Bisquert, S. Devautour-Vinot, J.C. Giuntini</i>	
Thermally Stimulated Current and Dielectric Relaxation of Inorganic/organic Ferroelectric Nanocomposites	38
<i>J. Capsal, E. Dantras, J. Dandurand, C. Lacabanne</i>	
Fundamental Study on Relaxation Processes of Water Tree in Aged Power Cables Aimed for Diagnosis with Spatial Resolution	39
<i>N. Hozumi, S. Hiei, T. Kurihara, T. Okamoto, K. Uchida</i>	

SESSION 9: TSC II

TSD Currents in Corona Poled FEP/ePTFE/FEP Sandwiches	40
<i>H. Von Seggern, S.N. Fedosov, S. Zhukov</i>	

SESSION 10: SOFT ACTUATORS AND SENSORS

Pressure Mapping Using Double Layer Dielectric System	41
<i>R. Kacprzyk, W. Ulatowski</i>	

Sound System with Wideband Piezoelectric Rectangular Loudspeakers Using a Truck Shaped PVDF Bimorph	42
<i>J. Ohga, T. Takei, N. Moriyama</i>	
Acoustic Characteristics and Structural Analysis of Flexible PVDF Loudspeaker	43
<i>T. Sugimoto, K. Ono, A. Ando, K. Kurozumi, A. Hara, Y. Morita, A. Miura</i>	
Enhancing the Performance of Electromechanically Active Elastomers	44
<i>T. Finnberg, F. Haase, B.J. Jungnickel</i>	
A New Cellular Electret Sensor-Actuator	45
<i>J.F.C. Windmill</i>	

SESSION 11: SOFT ACTUATORS AND SENSORS

Relaxor Fluorinated Polymers: Novel Applications and Recent Developments	46
<i>F. Bauer, Q. Zhang</i>	
Pyroelectric Polymer Sensors: Fabrication, Characterization and Application in Organic Electronics	47
<i>B. Stadlober, M. Zirkl, J. Groten, A. Haase, A. Fian</i>	

SESSION 12: ORGANIC ELECTRONICS

Organic Ferroelectric Multilayer for Programmable Logic Gate	48
<i>K. Ishida, S. Horie, Z. Matsushige, Y. Ueda</i>	
Charged OFETS: Tuning of Threshold Voltage and Off-Current of Organic Transistors for Adaptable Circuits and Amplifiers	49
<i>K.D. Deshmukh, J.E. West, H.E. Katz</i>	
Cellular Ferroelectrets for Soft Matter Integrated Devices with Advanced Functionality	50
<i>R. Schwodiauer, I. Graz, M. Kaltenbrunner, C. Keplinger, P. Bartu, G. Buchberger, C. Ortwein, S. Bauer</i>	
Micro Power Generator with High-performance Polymer Electret	51
<i>Y. Suzuki, M. Edamoto, N. Kasagi, K. Kashiwagi, Y. Morizawa</i>	

SESSION 13: MEMS AND APPLICATIONS

Patterning of SiO₂/Si₃N₄ Electret	52
<i>V. Leonov, R. Van Schaijk</i>	
Molecular Control of Optical Properties of Nanostructured Polymer Films	53
<i>O.N. Oliveira Jr., F.G.E. Guimaraes</i>	
Anisotropic Domain Orientation and Local, Reversible Polarisation Switching in Textured Ferroelectric Polymer Nanofibers	54
<i>M. Beub, N. Shingne, T. Thurn-Albrecht, U. Goesele, M. Steinhart</i>	
SPM Study of Ferroelectric Properties of Vinylidene Fluoride and Trifluoroethylene Copolymer	55
<i>Y. Takahashi, N. Tomoda, T. Furukawa</i>	

POSTER PRESENTATIONS

PVDF-Based Copolymers & Terpolymers from P(VDF-CTFE) 91/9 mol%	56
<i>H. Bao, C. Jia, K. Gu, Q. Shen</i>	
New Insights on P(VDF-TrFE)-based Copolymers	57
<i>V. Bornand, C. Vacher, A. Collet, P. Papet, F. Henn</i>	
Effect of Blended Nano-Clay on Crystallization and Ferroelectricity in Poly (Vinylidene Fluoride)	58
<i>E. Yamada, A. Nishioka, T. Koda, S. Ikeda</i>	
Ferroelectric Behavior in Poly (Trimethylene Terephthalate)	59
<i>G. Nakano, Y. Matsuda, S. Tasaka</i>	
Novel Fluoro-polymer Electret: Poly (Vinylidene fluoride-Hexafluoroisobutylene)	60
<i>S. Kondo, Y. Matsuda, S. Tasaka, J. Kurasawa</i>	
Morphology of Single Crystalline Film of P(VDF/TrFE) Copolymer	61
<i>K. Koga, K. Okamoto, H. Ohigashi</i>	
Enhanced Piezoelectric Activity in Melt-Quenched and Stretched Poly(Vinylidene Fluoride-Hexafluoropropylene) Films	62
<i>F. Wang, P. Frubing, W. Wirges, R. Gerhard</i>	
The Role of Space Charges on Polarization Fatigue in Ferroelectric P(VDF-TrFE) Copolymer Films	63
<i>G. Zhu, X. Luo, J. Zhang, Z. Zeng, X. Yan</i>	
Diagnostics on Cylindrical Case Film Capacitors by Space Charge Current Signature	64
<i>J. Reboul</i>	
Piezoelectric Materials- From Bulk Crystals to Thin Films and Nanostructures	65
<i>I.A. Andreyev, Y.A. Gorokhovatsky</i>	
High Piezoelectric Activity in Nonpoled Thin Films Prepared by Vapor Deposition Polymerization	66
<i>A. Kubono, M. Murai, S. Tasaka</i>	
New Mixed Rules on Composite Materials	67
<i>V. Holcman, K. Liedermann</i>	
Preliminary Study on Organic Memory Embedded Metal Nano-particle Stacking Layers	68
<i>Y. Yoshida, M. Chikamatsu</i>	
Scanning Pyroelectric Detection of Changes in the Spontaneous Polarization of P(VDF-TrFE) Thin Films	69
<i>M. Zirkl, B. Stadlober, J. Groten</i>	
Charge Distribution in Electron Beam Irradiated Various Polymers	70
<i>Y. Tanaka, M. Honjo, K. Nagasawa, H. Miyake, T. Takada</i>	
Direct Analysis of Heterogeneous Insulators with the PWP and the PEA Methods	71
<i>S. Hole, L.A. Dissado, J.C. Fothergill, J. Lewiner</i>	
Charge Transport Properties and Memory Effects in Organic Thin-film Transistors using Polymeric Dielectrics	72
<i>C. Yang, L. Chang, Y. Mai, H. Wang</i>	
Impact of Hot-Hole Injection on the Characteristics of High-Voltage MOS Transistors	73
<i>J.F. Chen, J.R. Lee, K. Wu, C.M. Liu</i>	

Photoconductivity Spectra of Polymeric Devices Using Poli (p-phenylene vinylene) (PPV) Derivatives as the Active Layer	74
<i>T. Cazati, L.F. Santos, F.T. Reis, R.M. Faria</i>	
Analysis of Particle Movements in a Single Phase Gas Insulated Busduct with Various Operating Conditions	75
<i>M.V.G. Rao, G.V.N. Kumar, J. Amarnathi, S. Kamakshaiiah, K.D. Srivastava</i>	
Ferroelectric Properties in PVDF/Mica Nanocomposites	76
<i>Y. Minami, K. Nakamura, Y. Takahashi, T. Furukawa</i>	
The Polarization State in VDF/TrFE Copolymer Thin Films Studied by Scanning Probe Microscopy	77
<i>N. Tomoda, Y. Takahashi, T. Furukawa</i>	
Evaluating Shock Wavefront Structure of Amorphous Polymers by Piezofilm Stress Gauge	78
<i>Y. Sato, T. Furukawa</i>	
Measurements of Electric Potential of Constant Charge Objects	79
<i>R. Kacprzyk</i>	
Optimization of a Biosensor based on a Piezoelectric Polymer Film	80
<i>P. Inacio, J.N. Marat-Mendes, E. Neagu, C.J. Dias</i>	
Flexible Touch- and Pressure Sensitive Piezo Elastomer Stretch Sensor for Simple Surface Position Detection	81
<i>R. Schwodiauer, C. Ortwein, G. Buchberger, I. Graz, P. Bartu, S. Bauer</i>	
Sound Shielding Control of Ear Protectors with PVDF	82
<i>H. Kodama, M. Date, K. Yamamoto, E. Fukada</i>	
Piezoelectret-microphones with Coiled Film Stacks	83
<i>J. Hillenbrand, G.M. Sessler</i>	
Electret Condenser Microphones for Hearing Aids	84
<i>T. Yamasaki, H. Kodama, Y. Yasuno</i>	
Electret Condenser Microphones for Measurement Instruments	85
<i>A. Ohyagi, D. Adachi, H. Kodama, Y. Yasuno</i>	
Heat-resistance Evaluation of SiO₂ Electret for Microphones	86
<i>Y. Yasuno</i>	
PbTiO₃/P(VDF-TrFE) Nanocomposites for Flexible Skin	87
<i>M. Krause, N. Gaar, R. Schwodiauer, S. Bauer-Gogonea, S. Bauer</i>	
In-plane homogeneity of polarization in thin VDF-TrFE Copolymer Films	88
<i>B. Ploss, Y. Takahashi, T. Furukawa</i>	
Simultaneous Measurements of (Q-V, C-V) and (Q-t, C-t) Characteristics in an MFS Capacitor with Ferroelectric VDF-TrFE Copolymer as a Gate Dielectric	89
<i>R. Yamamoto, A. Okada, D. Ito, Y. Takahashi, T. Furukawa</i>	
Polarization Fatigue Characteristics in VDF/TrFE Copolymer Thin Films with Au Electrodes	90
<i>K. Sakamoto, T. Nakajima, Y. Takahashi, T. Furukawa</i>	
Preparation and Piezoelectret Properties of Laminated Fluoropolymer Films Made of Porous Polytetrafluoroethylene and Non-porous Fluoroethylenepropylene	91
<i>J. Huang, X. Zhang, X. Wang, D. Pan, Z. Xia</i>	
Discharge Patterns in Three-layer Ferroelectret Systems with Perforated Polymer Films	92
<i>R.A.P. Altafim, H.C. Basso, R.A.C. Altafim</i>	

Piezoelectric Activity of Irradiation Cross-linked Polypropylene Films with Cellular Structure	93
<i>X. Zhang, X. Wang, D. Pan, J. Huang, Z. Xia</i>	
Improved Piezoelectric Thermal Stability of Cellular Polypropylene Ferroelectrets by Chemical Modification	94
<i>M. Zhao, Z. An, J. Yao, Y. Zhang, Z. Xia</i>	
Light Emission from Cellular Polypropylene Ferroelectrets under High Electric Fields and Its Correlation with Piezoelectricity	95
<i>X. Qiu, A. Mellinger, W. Wirges, R. Gerhard</i>	
Charging Conditions for Cellular-polymer Ferroelectrets with Enhanced Thermal Stability	96
<i>P. Fang, W. Wirges, R. Gerhard</i>	
Storage and Decay of Charges for Polypropylene Ferroelectret Films with Macroscopy Dipoles	97
<i>Z. Xia, F. Wang, X. Zhang, J. Huang</i>	
A Study on Stability of Piezoelectricity d_{33} in Porous Polymer Electrets	98
<i>H. Kodama, Y. Yasuno</i>	
Synthesis and Characterization of Fluorinated Poly(ether imide)s and their Application as Electret Materials	99
<i>D.P. Erhard, R. Giesa, V. Altstadt, H.W. Schmidt</i>	
Influence of Chemical Structure of Bisamide Additives on Charge Storage Properties of Isotactic Polypropylene	100
<i>N. Mohmeyer, C.V. Salis-Soglio, V. Altstadt, H.W. Schmidt</i>	
Study of the Structure and the Molecular Mobility of a New Biological Matrix (Collagen/Peptides)	101
<i>D. Tintar, V. Samouillan, J. Dandurand, C. Lacabanne, M. Spina, F. Naso, A. Gandaglia, R. Danesin, M. Dettin</i>	
Influence of the Polymer Chemical Structure on the Charge Storage of Polymer Blends	102
<i>D. Lovera, V. Altstadt, H.W. Schmidt</i>	
Electrical Characterization of Conducting Nanoparticles-polysiloxane Composites for a Space Durable Coating	103
<i>J. Beigbeder, P. Demont, P. Nabarra, S. Remaury, C. Lacabanne</i>	
Charge Transport and Storage in Cork/TetraPak® Composites: The Influence of Powder Drying Before Composite Manufacture	104
<i>M.C. Lanca, M. Brandt, E.R. Neagu, P.C. Silva, L. Gil, J.N. Marat-Mendes</i>	
Primary Research on Luminescence During Space Charge Detrapping and Recombination in LDPE	105
<i>C. Xiao, Y. Zhang, J. Lin, F. Zheng, Z. An, Q. Lei</i>	
A Direct Proof of Charge Injection/Extraction at the Metal-dielectric Contact	106
<i>E.R. Neagu, R.M. Neagu</i>	
Electrification of Polymers by Electron Irradiation	107
<i>H. Koizumi, M. Nagoya, R. Morishita, T. Ichikawa</i>	
Effects of Ferroelectric Heating on the Switching Characteristics in VDF/TrFE Copolymer Thin Films	108
<i>Y. Ikezaki, Y. Takahashi, T. Furukawa</i>	

Accurate Measurement and Analysis of Ferroelectric Switching Transients in thin VDF/TrFE Copolymer Films	109
<i>H. Ishii, T. Nakajima, Y. Takahashi, T. Furukawa</i>	
Additives to Improve the Electret Performance of Polypropylene	110
<i>C.V. Salis-Soglio, N. Mohmeyer, V. Altstadt, G.M. Sessler, H.W. Schmidt</i>	
Return Voltage Measurements: Theory and Applications to Charge Injection Monitoring.....	111
<i>P. Molinie, D. Koch, P. Llovera</i>	
Depolarization Current within the Symmetric Double-Well Potential for Solid Ionic Conductors.....	112
<i>S. Taraskin, F. Henn</i>	
Thermally Stimulated Current and Dielectric Relaxation of Inorganic/organic Ferroelectric Nanocomposites	113
<i>J. Capsal, E. Dantras, J. Dandurand, C. Lacabanne</i>	
Thermally Stimulated Discharge Current and Dielectric Spectroscopy of Polyvinylidene fluoride – Zinc Oxide Nanocomposite	114
<i>M.S. Gaur, P. Shukla, P. Saxena</i>	
Anomalous Thermally Stimulated Currents in High Molecular Weight Polypropylene.....	115
<i>K. Ikezaki, Y. Kudo, Y. Murata</i>	
Dielectric Relaxations in an Adhesive System	116
<i>E. Carsalade, A. Bernes, S. Perraud, C. Lacabanne</i>	
TSDC Studies of Relaxation in L-Asparagine Monohydrate	117
<i>D. Jain, L.S.S. Chandra, S. Bharadwaj, S. Anwar, V. Ganesan, N.P. Lalla, A.M. Awasthi, R. Nath</i>	
Investigation of the Liquid-Liquid Transition in Atactic Polystyrene by Thermally Stimulated Depolarization Current	118
<i>L. Gong, X. Zhang, J. He</i>	
Genuine and Apparent Thermally Stimulated Discharge Current Peaks	119
<i>R.M. Neagu, E.R. Neagu, C.J. Dias, M.C. Lanca, J.N. Marat-Mendes</i>	
Effect of Polarization Temperature on the Chain Segment.....	120
<i>H. Lu, X. Zhang</i>	
Crystalline Effects on the Chain Segment Motion, Charge Trapping and Detrapping in Nylon 1010	121
<i>H. Lu, X. Zhang, B. He</i>	
Thermally Stimulated Depolarization Currents in Bi₆Pb₂O₁₁.....	122
<i>N.I. Anisimova, G.A. Bordovsky, V.A. Bordovsky, R.A. Castro</i>	
Author Index	