

2023 Seminar on Microelectronics, Dielectrics and Plasmas (MDP 2023)

**Saint Petersburg, Russia
20 November 2023**



**IEEE Catalog Number: CFP23UU4-POD
ISBN: 979-8-3503-8358-4**

**Copyright © 2023 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP23UU4-POD
ISBN (Print-On-Demand):	979-8-3503-8358-4
ISBN (Online):	979-8-3503-8357-7

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
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Contents

Preface.....	2
Definition of Critical Currents in Superconducting Magnetic Energy Storage Systems <i>Bagan Gontrand Steve Sedjro Kalimov Alexander G., Vazhnov Sergey</i>	3
XPS Studies of Adsorption Sites on the Surface of Gas Sensitive Zinc Oxide Based Nanostructures <i>Arkhipenko Viktoriya A., Guketlov Aslan M., Bezverkhniy Vladislav P., Shomakhov Zamir V., Nalimova Svetlana S., Moshnikov Vyacheslav A.</i>	7
Modeling of Nanostructuring Processes of Lead Chalcogenide Layers under Sensitizing Oxidation <i>Bezverkhniy Vladislav P.</i>	11
Investigation of Structural and Dielectric Properties of thin Films (Sr/Ba) Nb ₂ O ₆ on Al ₂ O ₃ Substrates in the Field of Microwave Applications..... <i>Bogdan Alexey, Karamov Artem R. Sapego Evgeny N. Tumarkin Andrei V.</i>	14
Research of Microwave Radiation Absorption of FDM Printing Materials..... <i>Chemerev Ilya</i>	18
Design and Fabrication of Normally-on and Normally-off Ultrathin AlN-based Transistors <i>Chukanova Olga B., Egorkin Vladimir I., Zemlyakov Valery E., Zhuravlev Maxim N/</i>	23
Investigation of Mechanical Characteristics of Pressuring Materials of Generators Stator Winding in Thermal Aging Process <i>Fedotov Nikita A., Shikova Tatyana M., Belko Victor O., Kostelov Andrey M., Mannanov Emil R., Chernyshov Dmitriy A.</i>	27
Causes of Resistance Decrease of Corona Protection Materials in Thermal Aging Process <i>Fedotov Nikita A., Shikova Tatyana M., Belko Victor O., Reznik Alexandr S., Kostelov Andrey M., Mannanov Emil R.</i>	31
Optimization Analysis of the Main Insulation Structure of the Large Generator Stator Bar <i>Feng Shengxi, Belko Victor O.</i>	35
Influence of Laser Radiation Power on Raman Spectra of Nanostructured Silicon Wires with Crystallographic Orientation (111) <i>Gagarina Alena Yu., Kuznetsov Alexey, Spivak Julia M., Bolshakov Aleksey D., Moshnikov Vyacheslav A.</i>	40
Electroplasma Technologies for Cleaning, Polishing and Welding of Metals <i>Gaysin Fivzat M., Bagautdinova Liliya N., Gaisin Almaz F., Gaisin Azat F., Mastuykov Karim Sh., Zakirov Dzhaudat U.</i>	43
Modeling of the Magnetic Field and Current Density Distributions in HTS SMES Systems <i>Govor Vladislav M., Kalimov Alexander G., Kobzar Evgenii N.</i>	47
The Effect of Liquid Dielectric Impregnation on the Self-Healing Characteristics <i>Ivanov Ivan O., Feklistov Efrem G.</i>	52
The Phenomenon of Low Frequency Dielectric Losses Increasing in Metallized Film Capacitors <i>Ivanov Ivan O., Hojamov Ahmet A.</i>	56
Investigation of Particles Obtained by Green Synthesis Using Plant Extract <i>Khalugarova Kamilya, Kondratev Valeriy M., Kuznetsov Alexey, Gagarina Alena Yu.</i>	60
Different Approaches to Increasing the Continuous Operation Time of IPMC Actuators..... <i>Khmelnitskiy Ivan K., Testov Dmitriy O., Aivazyan Vagarshak M., Luchinin Victor V., Korlyakov Andrey V., Karelin Alexandr M.</i>	63
Investigation of the Electro Physical Properties of the Components of Modern Paper-Impregnated Insulation <i>Kiesewetter Dmitry V., Zhuravleva Natalia M., Reznik Alexandr S., Litvinov Danila, Trubin Denis, Le Sun</i>	67
Research of Low-Cost Technological Process for Manufacturing of One Side Silicon Interposer <i>Kochergin Mikhail D., Vertyanov Denis V., Belyakov Igor A., Zhumagali Raiymbek N.</i>	71
LNA IC Development for LTE Bands Based on Bulk CMOS 180nm Digital Library <i>Kotlyarov Evgeny Yu., Putrya Mikhail, Mikhailov Viktor, Zubov Igor, Timoshin Sergey</i>	75

Complex Dielectric Permittivity Measurement of 3D Printing Resin FTD Nano Clear in the 1-10 GHz Band	82
<i>Migalin Mikhail M., Kovalev Andrey V., Gadzhiev Samir R., Kuzmin Vladislav S., Libin Lev N., Fleyteng Vladimir A.</i>	
Investigation of the Power Source Parameters Influence for the Plasma Jet of DC Plasma Torch.....	86
<i>Murashov Iurii, Zhiligotov Ruslan, Obratsov Nikita, Kurakina Natalia I.</i>	
Hardware Realization Version of a Neuron for a Self-routing Analog-to-digital Converter	91
<i>Naborshikov Anton A., Posyagin Anton I., Artemyev Ilya A., Tsyganstsev Vyacheslav A.</i>	
Adaptive LUT - Decoder LUT for FPGAs	95
<i>Oputin Nikita E., Tyurin Sergey F.</i>	
Charge Relaxation in Polylactide/Montmorillonite Composite Materials	99
<i>Pavlov Andrey A., Kamalov Almaz M., Borisova Margarita E., Kovalenko Mikhail A., Goldade Victor A., Zotov Sergey V.</i>	
Experimental Study of Self-Healing Characteristics and Insulation Resistance of Metallized Polypropylene Film under Various Inter-Layer Pressure	103
<i>Pechnikov Alexey V., Hojamov Ahmet A.</i>	
Study of the Sensitive Element of a Resonant Pressure Sensor with Membranes of Various Shapes	109
<i>Phyo Win Tun, Timoshenkov Sergey P., Simonov Boris M.</i>	
Investigation of the Aging of Electrical Insulating Paper in Polydimethylsiloxane Liquid	112
<i>Reznik Alexandr S., Zhuravleva Natalia M., Kiesewetter Dmitry V., Poyarkov Pavel A., Smirnova Ekaterina G.</i>	
The Research of GaN HEMT Transistor Input Gate Capacitance Dependence as a Function of Operating Mode in GHz Band	115
<i>Rodionov Denis V., Khlybov Alexander I., Kotlyarov Evgeny Yu., Timoshenkov Pavel V., Guminov Nikolay V.</i>	
Concentric Topology for Sensitive Elements of Surface Acoustic Wave Devices	119
<i>Sorvina Maria A.</i>	
Multi-function LUT for FPGAs	122
<i>Sovetov Stanislav I., Tyurin Sergey F.</i>	
Arc Spot Movement and Its Effect on Flow in an AC Plasma Torch	127
<i>Surov Alexander, Obratsov Nikita, Bykov Nikolay, Nakonechny Ghennady</i>	
One-hot Programming LUT for FPGAs	132
<i>Vasenin Ivan, Tyurin Sergey</i>	
Thermal and Thermoelectric Properties of Bi-Te-Sb and Bi-Te-Se Doped by Carbon Additive.....	136
<i>Voloschuk Irina A, Babich Alexey V., Rogachev Maxim S., Glebova Daria D., Bozhedomova Anastassiya S., Babich Tatiana A.</i>	
Modeling and Analysis of the Functioning of the Sensitive Element of a Capacitive Microaccelerometer Based on the Microstructure of Silicon Carbide(Sic) and Silicon(Si)	139
<i>Ye Ko Ko Aung, Simonov Boris M., Timoshenkov Sergey P., Phyo Win Tun, Paing Soe Thu</i>	
Fractal Character of the Conductor Destruction in the Zone of Local Increase of the Pulsed Current Density	144
<i>Zhukov Dmitry V., Krivosheev Sergey I., Magazinov Sergey G., Kiesewetter Dmitry V., Malyugin Victor I.</i>	

Autors Index