

**2022 IEEE International  
Conference on Nanoelectronics,  
Nanophotonics, Nanomaterials,  
Nanobioscience &  
Nanotechnology (5NANO 2022)**

**Kottayam, India  
28-29 April 2022**



**IEEE Catalog Number: CFP22Z39-POD  
ISBN: 978-1-6654-3729-5**

**Copyright © 2022 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:	CFP22Z39-POD
ISBN (Print-On-Demand):	978-1-6654-3729-5
ISBN (Online):	978-1-6654-3728-8

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## TABLE OF CONTENTS

Thermal Performance of Dynamic Rail to Rail Voltage Comparators Designed Using 16nm Technology with a $V_{DD}$ of 0.7 V .....	1
<i>Kashetti Shreya, Nayab Fatima, Koyada Samanvitha, Mekala Srilatha, J. Ajayan, Shubham Tayal</i>	
Realization of Si Based Vertical PIN Photodiode Structure in COMSOL Multiphysics .....	6
<i>Sanjeev Mani Yadav, Amritanshu Pandey</i>	
Design of PERC Cell Using $SiO_2$ , $Si_3N_4$ , and $Al_2O_3$ with the Novel Technique for Enhanced Absorption of Silicon Selective Emitter for Solar Cell Processing .....	9
<i>Kholee Phimu, Khomdram Jolson Singh, Rudra Sankar Dhar</i>	
Curing Free, Silver Nano Ink Based Inkjet Printed Fabrics for Bio-Medical Applications .....	15
<i>Subitha D, Rahul S G, Velmurugan S, Salveru Saiteja</i>	
Effect of Thin Gold Film in Plasmonic Based Liquid Infiltrates Photonic Crystal Fiber Chemical Sensor:Design and Analysis .....	19
<i>M Parthiban, S Revathi</i>	
Data-Driven Modeling for Tribological Performance of Nano-Lubricants Using Artificial Neural Network.....	24
<i>Trishul Kulkarni, Arun Autee, Bhagwan Toksha, Aniruddha Chatterjee</i>	
Numerical Analysis on $H_2$ Plasma Assisted Growth of Graphitic Leaves on Carbon Nanotube .....	36
<i>Shruti Sharma, Suresh C. Sharma</i>	
Impact of PECVD Characteristics on Metrics of a Plasma-Assisted Vertically Aligned Carbon Nanotube FET (VA-CNTFET) Device .....	39
<i>Mansha Kansal, Suresh C. Sharma</i>	
Prediction of Electronic Parameters of Carbon Nanotube Random Network Field-Effect Transistors Under Liquid Gated Conditions Using a Machine Learning Approach .....	43
<i>Thanihaichelvan Murugathas, Veena R, Natalie O. V. Plank, Pirunthan Keerththinaathan, Petra M. I, Prabu Mohandas</i>	
RF Performance Assessment of Sub-8nm GaN-SOI-FinFET Using Power Gain Parameters * .....	48
<i>Ajay Kumar, Neha Gupta, Amit K. Goyal, Yehia Massoud</i>	
Performance Optimization of Full Swing Adders for Future DSP & Machine Learning Applications Using 16 nm CMOS Process at High Temperatures .....	52
<i>Kethe Manideep, Bandari Abhinav, Vinay Madan Gaddam, Lavudya Vamshi Krishna, Ailla Niharika, J. Ajayan</i>	
A Study on $CuPc:C_{60}$ and Other Emerging Organic Materials in Solar Cell Applications .....	58
<i>Sreejith S, Babu Devasenapati S, Anitha Mathew, Anooja B, Radhika. J. M, Ajayan. J</i>	
A Review on P3HT:PCBM Material Based Organic Solar Cells .....	63
<i>Sreejith S, Arun A. V, B. Sivasankari, Karthika. A, Gautami. A, Ajayan. J</i>	
An Overview of Photovoltaic Performance of Organic Solar Cells Using PCDTBT:PCBM and PTB7:PCBM Active-Layer Materials .....	69
<i>Sreejith S, Radhika. J. M, Arun A. V, N. J. R. Muniraj, J. Geetha Ramani, Ajayan. J</i>	

Effect of Gold Thin Film Deposition in holey-Fiber Based Liquid Sensor.....	75
<i>Parthiban. M, Dhruv Kumar, Sonu Ashritha K. S, Pruthvi Uday, Revathi. S</i>	
Design and Implementation of Effective Hybrid Reversible Multilayer Vedic Multiplier Using QCA-ST .....	80
<i>Swarup Sarkar, Rupsa Roy</i>	
Transfer of 2D Nanostructures with Reduced Residues: Influence of Water-Soluble Layer and Fabrication of Photodetector .....	85
<i>Madan Sharma, Rajendra Singh, Aditya Singh</i>	
Analysis of Significant Parameters of Miscellaneous Insulating Fluids with Antioxidants .....	90
<i>Dhanya, Helan Gethse, Diana Hyden, Muthu Selvi, Samuel Pakianathan</i>	
Design and Control Over Morphology of Pseudopeptidic Bottlebrush Polymer/Liquid Crystal Composites .....	95
<i>Asha Kumari, Sameer Dhawan, Hanuman Singh, V. Haridas, Aloka Sinha</i>	
Effect of Single Vacancy Defect on ION/IOFF and Subthreshold Swing in Electrostatically Doped Armchair Graphene Nanoribbon Field-Effect Transistor with Different Widths .....	101
<i>Ashique E Elahi Sadi, Mahfuzur Rahman Munna, Mahbub Alam</i>	
A Theoretical Study on Palladium-ZincOxide System.....	107
<i>Radhakrishna K Bhagavan Nagasai, B Suvarna Pooja, K Meher Preethi, R Sahithi Arjun, Aniruddh Bahadur Yadav</i>	
RTL to GDSII Implementation of RADIX-4 Booth Multiplier.....	111
<i>Tanya Gaurav, Krutarthkumar Patel, Rutu Parekh</i>	
Simulation and Comparison of AlGaN LEDs with Boron Doped GaN Well Using Assorted Aluminium Concentration .....	116
<i>G. Dhivyasri, D. Nirmal, M. Manikandan, G. Gokiladeepa, J. Ajayan, M Menagadevi</i>	
Polyaniline Wrapped Graphene/TPU Composites – a Potential Candidate for Electromagnetic Interference Shielding .....	119
<i>A. P Sobha, C. P Vineetha</i>	
Analysing the Effects of Varying Parameters in a MESFET .....	124
<i>Neha Jain, Pragya Maheshwari, Saumya Aghera, Idika Mittal, Deval Sonani, Marmik Sileshkumar Prajapati, Rutu Parekh</i>	
Modeling Nanoscale Depletion Mode MESFET and Comparative Study for Different Semiconductor Materials.....	131
<i>Rudra Biswas, Mahbub Alam</i>	
Performance Evolution of GaAs-Based Solar Cell Towards >30% Efficiency for Space Applications.....	137
<i>Ajay Kumar, Melvin S. Thomas, Gulshan Pareek, Aditya Jain, Neha Gupta</i>	
OFF Current Reduction Using Zener Tunneling in Tunnel Diode Body Contact Silicon on Insulator .....	140
<i>Sumi Baby, George Bonny Vincent, Anju Pradeep</i>	
A Study on Optical Interconnects to Improve On-Chip Wireless Communication Using Plasmonic Nanoantennas and Seeking Dielectric Nanoantenna as an Alternative .....	146
<i>T R Sangeeta, J Deny</i>	

Impact of Channel Thickness on the Performance of JL-DG MOSFET Based NAND, NOR, and NOT Logic Gates .....	151
<i>Srija Katharashala, Sahithya Gandla, Vamshi Bommineni, Shubham Tayal, Sresta Valasa, J. Ajayan</i>	
Sensitivity Estimation of Bragg Fibers Having Double Defect Layers .....	155
<i>Chandan Singh Yadav, Abhishek Upadhyay, Vivek Singh</i>	
Performance Optimization of $L_G = 16$ nm Pulse Triggered Low Power High Speed Data Flip-Flops at Higher Temperatures with a $V_{DD}$ of 0.7 V .....	158
<i>Kandukuri Amulya, Kodam Soniya, Shaik Rabbani, Vadde Koushik Varma, J. Ajayan, Usha Desai</i>	
Design and Analysis of Low-Power High Performance 4-Bit Parallel Shift Register Using Retentive True Single Phase Clocked D-Flip Flop.....	163
<i>Laxman Raju Thoutam, Dugyala Alekya, Chunkari Charvika Triveni, Sirikonda Shruthi, Kamagoni Varun, J. Ajayan</i>	
Tunable Plasmon Resonance in Asymmetric Plasmonic Cross-Bowtie Nanostructures.....	168
<i>Kirti Dalal, Yashna Sharma</i>	
Minimizing Solar Absorption Losses in $TiO_2$ Particles-Based Passive Daytime Radiative Cooling Coatings.....	171
<i>Bhriugu Rishi Mishra, Karthik Sasihithlu</i>	
Impact of Side-Wall Spacer on the Performance of Double Gate Steep Switching Tunnel FET .....	174
<i>Satya Gopal Dinda, S. Sundar Kumar Iyer</i>	
Study of Confined Stark Effect on Refractive Index and Coefficient of Absorption for a $Ga_xAl_{1-x}As/GaAs/Ga_xAl_{1-x}$ as Finite Potential 1-D Quantum Dot.....	178
<i>Rohit Chaurasiya, Suman Dahiya, Rinku Sharma</i>	
Performance Analysis of Silicon Nanowire FET for GAA and Pi Gate Configurations.....	181
<i>Siddharth Deshpande, Shein Sopariwala, Ritvik Singhvi, Raghav Khandelwal, Jigarkumar Marvaniya, Rutu Parekh</i>	
Slot Waveguide Microring Resonator Based on Silicon Nitride for Refractive Index Sensing .....	187
<i>K Jayakrishnan, V Hitaishi, N. Ashok</i>	
Effect of Bridging on D- $\pi$ -D Structures for Efficient Use in Organic Electronic Devices: DFT Investigation .....	190
<i>Ankit Kargeti, Tabish Rasheed, Shamoan Ahmad Siddiqui</i>	
CNTFET: Comparative Study of Planar and Coaxial .....	194
<i>Priya Patel, Jaykumar Dave, Mohmadsohil Momin, Chirayu Sheth, Rushabh Gajab, Meet Dadhania, Rutu Parekh</i>	
Effect of Co-Pollutants on the Photocatalytic Activity of Fe Doped ZnO Nanoparticles on the Degradation of Methylene Blue .....	201
<i>Charitha Thambiliyagodage, Nishadi Lokuge</i>	
Recent Advances in Nanocomposite Soft Magnetic Materials: A Review.....	206
<i>R Santhosh Kumar, Rashmi, J. Sundara Rajan</i>	

Parameterized Comparison of Carbon Nanotube and Graphene Nanoribbon Field Effective Transistor.....	212
<i>Richa Patel, Akshar Joshi, Milan Nagariya, Aniket Vyas, Param Modi, Mahiraj Rathod, Ritu Parekh</i>	
Synbiotic Hydrogels Encapsulating Iron and Probiotic Provide Iron Bioavailability Equivalent to Commercially Available Iron Supplements.....	218
<i>Poonam Sagar, Ritika Gupta, Nitin Kumar Singhal</i>	
Review on Stress Detection and Management Techniques Using Nano EEG Sensors .....	223
<i>G. Praveena, J. M. Mathana</i>	
Extraction of Space Debris Approach: Diminish the Threats from Outer Space.....	230
<i>Mithun Dutta, Md. Ashiqul Islam, Akash Mohajon, Shaikat Dev, Dhonita Tripura, Iftakher Ahmed</i>	
A Fresnel-Reflection Based Fiber-Optic Sensor to Study the Low-Temperature Thermodynamics in Fluidic Mixtures .....	236
<i>Mani Priyadarshini, Pachiyappan Arulmozhivarman</i>	
Comparative Study of Ge-Doped $\text{CH}_3\text{NH}_3\text{Ge}_x\text{Pb}_{(1-x)}\text{I}_3$ Perovskite Solar Cell by SCAPS-1D Software .....	239
<i>Kapil Kumar Jha, S. K. Tripathy, Amel Laref, T. R. Lenka</i>	
RTL & Physical Design Flow of Power Efficient Components of All Digital Phase Locked Loop (ADPLL) .....	245
<i>Aaditya Joshi, Nishit Nathwani, Ritu Parekh</i>	
Design and Development of Reliable Low Power High Speed 4-Bit Array Multiplier Using High Performance 1-Bit Full Adders.....	251
<i>Dande Praneeth, Rupireddy Varshitha, Seelan Sai Prashanth, Varikoti Mahesh, Laxman Raju Thoutam, J. Ajayan</i>	
Design of Low Power 2-Bit Flash ADC Using High Performance Dynamic Double Tail Comparator.....	257
<i>Laxman Raju Thoutam, Gurajala Rajya Vardhini, Kakanaboina Ramya, Macherla Neeraj, Souram Ravikumar, J. Ajayan</i>	
Performance Analysis of Dielectrically Separated Independent Gates Junctionless DG-MOSFET: A Digital Perspective .....	262
<i>Navya Guduri, Divya Kannuri, Rajanikar Reddy Maram, Naveen Kumar Kevuloth, Sresta Valasa, Shubham Tayal</i>	
Junctionless Tunnel FET for High-Temperature Applications from an Analog Design Perspective .....	266
<i>Sujay Routh, Deepjyoti Deb, Ratul K Baruah, Rupam Goswami</i>	
Performance Analysis of FinFET Based Ternary Inverter .....	270
<i>N. Vinodh Kumar, A. Mohanbabu, Kunal Rasaily, Setti Veera Manikanta</i>	
Surface Damping of Plasmon Oscillations of a Spherical Metal Nanoshell.....	276
<i>Ivan A. Pavlichenko</i>	
Enhancing the Properties of Carbon Fiber Thermoplastic Composite by Nanofiber Interleaving .....	280
<i>Vishnu Vijay Kumar, Suresh Rajendran, S Surendran, Seeram Ramakrishna</i>	

Predicting the Tensile Strength of Materials Applying Machine Learning for Polymeric Manufacturing .....	284
<i>M I Sabaruddin, A M Khalid, C M Lee, M A Mahmood, R Veena, Abul Kalam Azad, Malik M. Nauman</i>	
RTL to GDSII Flow Implementation of 8-Bit Baugh-Wooley Multiplier .....	290
<i>Vidhi Pala, Vishank Makhe, Khyati Bhuva, Rutu Parekh</i>	
Design of Infrared Audio Transmitter and Receiver for Point to Point Data Transmission .....	296
<i>R. Seetharaman, A. Menaka, K. Anandan</i>	
Analysis of Serializer for High Speed Transmission .....	300
<i>R. Seetharaman, A. Menaka, K. Anandan</i>	
Investigation of Efficiency Enhancement in Tunnel Junction GaN Light Emitting Diodes .....	304
<i>Eugene Peter, T. D. Subash, R Veena</i>	

**Author Index**