

2017 Spanish Conference on Electron Devices (CDE 2017)

**Barcelona, Spain
8-10 February 2017**



IEEE Catalog Number: CFP17589-POD
ISBN: 978-1-5090-5073-4

**Copyright © 2017 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:	CFP17589-POD
ISBN (Print-On-Demand):	978-1-5090-5073-4
ISBN (Online):	978-1-5090-5072-7
ISSN:	2163-4971

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

TABLE OF CONTENTS

FROM MATERIALS TO DEVICES: BOTTOM-UP INTEGRATION OF NANOMATERIALS ONTO SILICON MICROSTRUCTURES FOR THERMOELECTRIC AND PIEZOELECTRIC APPLICATIONS	1
<i>Luis Fonseca ; Carlos Calaza ; Marc Salleras ; Gonzalo Murillo ; Jaume Esteve ; Albert Tarancón ; Alex Morata ; Jose D. Santos ; Gerard Gadea</i>	
ZNO AND ZNO/SNO₂ NANOFIBERS AS RESISTIVE GAS SENSORS FOR NO₂ DETECTION	5
<i>I. Sayago ; E. Hontañón ; M. Aleixandre ; M. J. Fernández ; J. P. Santos ; I. Gràcia</i>	
IMPACT OF SELF-HEATING AND HOT PHONONS ON THE DRIFT VELOCITY IN GRAPHENE	9
<i>José M. Iglesias ; María J. Martín ; Elena Pascual ; Raúl Rengel</i>	
TOP ELECTRODE DEPENDENCE OF THE RESISTIVE SWITCHING BEHAVIOR IN HFO₂/N+SI-BASED DEVICES	13
<i>J. Muñoz-Gorriz ; M. C. Acero ; M. B. Gonzalez ; F. Campabadal</i>	
MICROMACHINED SENSORS BASED ON ZNO STRUCTURES AND THEIR THERMO- AND PHOTO-ACTIVATED RESPONSE TO REDUCING GASES.....	17
<i>S. Vallejos ; I. Gràcia ; E. Figueras ; C. Cané ; N. Pizárova ; J. Hubálek</i>	
A COMBINED MONTE CARLO-BALANCE EQUATIONS INVESTIGATION OF THE HIGH FREQUENCY RESPONSE OF GRAPHENE	21
<i>Raúl Rengel ; José M. Iglesias ; Elena Pascual ; María J. Martín</i>	
HIGH CHANNEL MOBILITY IN 4H-SIC N-MOSFET USING N₂O OXIDATION COMBINED WITH BORON DIFFUSION TREATMENT	25
<i>M. Cabello ; V. Soler ; J. Montserrat ; J. Rebollo ; P. Godignon ; J. Millan</i>	
IMPROVED TRANSMISSION AND THERMAL EMISSION IN MACROPOROUS SILICON PHOTONIC CRYSTALS WITH 700 NM PITCH	29
<i>D. Cardador ; D. Segura ; D. Vega ; A. Rodríguez</i>	
MONTE CARLO ANALYSIS OF III-V PIN DIODES FOR TUNNEL-FETS AND IMPACT IONIZATION-MOSFETS	32
<i>B. G. Vasallo ; V. Talbo ; T. González ; Y. Lechaux ; N. Wichmann ; S. Bollaert ; J. Mateos</i>	
SENSING PROPERTIES OF ZNO NANOSTRUCTURED LAYERS	36
<i>Lluís M. Guia ; Pedro J. Rodríguez-Cantó ; Vicente Muñoz-Sanjosé ; Sergio Arana ; Cándid Reig</i>	
ACTIVE SURFACE POTENTIAL CONTROL IN NANOSTRUCTURED MOX LAYERS	40
<i>M. Domínguez-Pumar ; L. Kowalski ; R. Calavia ; E. Llobet</i>	
CHARACTERIZATION OF AMORPHOUS SI GENERATED THROUGH CLASSICAL MOLECULAR DYNAMICS SIMULATIONS	44
<i>Iván Santos ; Pedro López ; María Aboy ; Luis A. Marqués ; Lourdes Pelaz</i>	
DC CHARACTERISTICS WITH SUBSTRATE TEMPERATURE FOR GAN ON SI MOS-HEMTS	48
<i>R. Rodríguez ; B. González ; J. García ; A. Vega ; A. Núñez</i>	
CONDITIONING LAB ON PCB TO CONTROL TEMPERATURE AND MIX FLUIDS AT THE MICROSCALE FOR BIOMEDICAL APPLICATIONS	52
<i>Miguel Cabello ; Carmen Aracil ; Francisco Perdigones ; José M. Quero</i>	
PRELIMINARY ANALYSIS OF ANNEALING IMPACT ON 1 EV GANASSB SOLAR CELLS	56
<i>I. Lombardero ; M. Ochoa ; I. García ; M. Hinojosa ; P. Caño ; I. Rey-Stolle ; C. Algora ; A. Johnson ; J. I. Davies ; K. H. Tan ; W. K. Loke ; S. Wicaksono ; S. F. Yoon ; R. Romero ; M. Gabás</i>	
RESISTIVE SWITCHING WITH BIPOLAR CHARACTERISTICS IN TIN/TI/HFO₂/W DEVICES	60
<i>S. Poblador ; M. C. Acero ; M. B. González ; F. Campabadal</i>	
DEVELOPMENT OF GAS SENSORS BASED IN PHOTONIC CRYSTAL SLABS	64
<i>Oraman Yoosefi ; Mj Yahyapour ; Daniel Segura ; Didac Vega ; Federico Dios ; Angel Rodriguez</i>	
LOVE WAVE TOLUENE SENSOR BASED ON MULTI-GUIDING LAYERS	67
<i>D. Matatagui ; M. J. Fernández ; J. L. Fontech ; J. P. Santos ; I. Sayago ; M. C. Horrillo ; I. Gràcia ; J. Lozano</i>	
ANALYSIS OF BIDIRECTIONAL SWITCH SOLUTIONS BASED ON DIFFERENT POWER DEVICES	70
<i>M. Fernández ; X. Perpiñà ; M. Vellvehi ; D. Sánchez ; X. Jordà ; J. Millán ; T. Cabeza ; S. Llorente</i>	
INFLUENCE OF PROCESS-VOLTAGE-TEMPERATURE VARIATIONS ON THE BEHAVIOR OF A HYBRID SET-FET CIRCUIT	74
<i>E. Amat ; J. Bausells ; F. Perez-Murano</i>	

RESISTIVE SWITCHING BEHAVIOR OF GRAPHENE OXIDE FILMS IN SYMMETRIC METAL-INSULATOR-METAL STRUCTURES	78
<i>Raquel Rodriguez-Lamas ; Eduard Masvidal-Codina ; Gerard Pedreira ; Adrián Sáez ; Gemma Rius</i>	
A PHYSICALLY BASED MODEL TO DESCRIBE RESISTIVE SWITCHING IN DIFFERENT RRAM TECHNOLOGIES	82
<i>G. González-Cordero ; M. B. González ; H. García ; F. Campabadal ; S. Dueñas ; H. Castán ; F. Jiménez-Molinós ; J. B. Roldán</i>	
EVALUATION OF ENERGY BARRIERS FOR TOPOLOGICAL TRANSITIONS OF SI SELF-INTERSTITIAL CLUSTERS BY CLASSICAL MOLECULAR DYNAMICS AND THE KINETIC ACTIVATION-RELAXATION TECHNIQUE	86
<i>Pedro López ; D. C. Ruiz ; I. Santos ; M. Aboy ; L. A. Marqués ; M. Trochet ; N. Mousseau ; L. Pelaz</i>	
MOVPE ISSUES IN THE DEVELOPMENT OF ORDERED GAINP METAMORPHIC BUFFERS FOR MULTIJUNCTION SOLAR CELLS	90
<i>Manuel Hinojosa ; Iván García ; Oscar Martínez</i>	
THE DESIGN OF A NOVEL STRUCTURAL FOUR-BEAMS-BOSSED-MEMBRANE (FBBM) PIEZORESISTIVE PRESSURE SENSOR	94
<i>Chuang Li ; José L. Ocaña</i>	
SPICE MODELING OF RRAM THERMAL RESET TRANSITIONS FOR CIRCUIT SIMULATION PURPOSES	98
<i>F. Jiménez-Molinós ; G. González-Cordero ; P. Cartujo-Cassinello ; J. B. Roldán</i>	
COST-EFFECTIVE CLEANING SOLUTIONS BASED ON H₂O/NH₃/H₂O₂ MIXTURES FOR ALD Al₂O₃ PASSIVATED IBC C-SI SOLAR CELLS	102
<i>G. Masmítjà ; P. Ortega ; I. Martín ; J. Pérez ; G. López ; E. Calle ; L. G. Gerling ; C. Voz ; R. Alcubilla</i>	
COMPUTATION METHOD AND COMPARISON OF SEMICONDUCTOR POWER LOSSES WITHIN BIDIRECTIONAL SWITCHES (BDS)	105
<i>J. L. Gálvez ; X. Perpiñà ; M. Vellvehi ; D. Sánchez ; X. Jordà ; J. Millán</i>	
INTERDIGITATED BACK CONTACTED C-SI(P) SOLAR CELLS WITH PHOTOVOLTAIC EFFICIENCIES BEYOND 22%	109
<i>E. Calle ; P. Ortega ; G. López ; I. Martín ; D. Carrió ; G. Masmítjà ; C. Voz ; A. Orpella ; J. Puigdollers ; R. Alcubilla</i>	
THE USE OF ELECTRICAL MACHINING FOR PATTERNING AND OXIDATION OF GRAPHENE IN LOW COST MANUFACTURING	113
<i>A. L. Alvarez ; F. Borrás ; J. S. Moreno ; M. García-Vélez ; C. Coya ; E. Climent ; C. Munuera ; A. De Andrés</i>	
DETECTION OF LOW LEVELS OF NO₂ WITH ELECTROSPUN TIN DIOXIDE NANOFIBERS BASED SENSORS	117
<i>J. P. Santos ; E. Hontañón ; I. Sayago ; M. J. Fernández ; J. Lozano</i>	
MULTIJUNCTION SOLAR CELLS INCORPORATING GROUP IV SIGESN ALLOYS	121
<i>Pablo Caño ; Iván Lombardero ; Ignacio Rey-Stolle ; Andrew Johnson ; Rick Hoffman</i>	
LOCK-IN INFRARED THERMOGRAPHY: A TOOL TO LOCATE AND ANALYSE FAILURES IN POWER DEVICES	124
<i>M. Vellvehi ; X. Perpiñà ; J. León ; D. Sánchez ; X. Jordà ; J. Millán</i>	
ADVANCED ELECTRICAL CHARACTERIZATION OF ATOMIC LAYER DEPOSITED Al₂O₃ MIS-BASED STRUCTURES	128
<i>H. García ; H. Castán ; S. Dueñas ; M. B. González ; M. C. Acero ; F. Campabadal</i>	
COUPLING DEFECTS IN MACROPOROUS SILICON PHOTONIC CRYSTALS	132
<i>David Cardador Maza ; Daniel Segura Garcia ; Didac Vega Bru ; Angel Rodriguez Martínez</i>	
RF NOISE MODEL FOR ALGAN/GAN HEMT	135
<i>Wondwosen Eshetu Muhea ; Antonio Lazaro ; Benjamin Itíñiguez ; Fetene Mulugeta Yigletu</i>	
INTEGRATED ANION-EXCHANGE CARTRIDGE FOR [18F]F-PRECONCENTRATION IN A PDMS RADIOPHARMACY CHIP	139
<i>B. Salvador ; A. Luque ; J. M. Quero ; L. Fernández ; A. Corral ; D. Orta ; I. Fernández</i>	
MULTISENSOR PLATFORM FOR INDOOR AIR QUALITY MEASUREMENTS	143
<i>J. González-Chávarri ; E. Hammes ; L. Parellada ; I. Castro-Hurtado ; E. Castaño ; I. Ayerdi ; H. Knapp ; G. G. Mandayo</i>	
MEASURING LOW H FIELD AND CURRENTS WITH AMR SENSORS	147
<i>Miriam Naranjo-Esparcia ; Jan Kubik ; Pedro Tomás-Molina ; Javier Calpe ; Cándid Reig</i>	
ANALYTICAL TRANSFER EQUATIONS FOR THE SPECTRAL MODELLING OF III-V MULTI-JUNCTION CONCENTRATOR SOLAR CELLS	151
<i>Jose A. Caballero ; Eduardo F. Fernández ; Gustavo Nofuentes ; Alberto Soria-Moya ; Florencia Almonacid ; Pedro Pérez-Higueras ; Marios Theristis ; George E. Georgiou ; Antonio García-Loureiro</i>	
TECHNOLOGICAL SOLUTIONS FOR LARGE AREA MICROSTRIP RADIATION SILICON SENSORS FOR THE LHC UPGRADE	155
<i>J. Fernández-Tejero ; M. Ullán ; C. Fleta ; D. Quirion</i>	

IMPROVING A NOZZLE TIP WITH A GUARD RING FOR AN ELECTROSPRAY SYSTEM.....	159
<i>Brennen Véliz ; Sandra Bermejo ; Luis Castañer</i>	
SPICE SIMULATION OF 1T1R STRUCTURES BASED ON A LOGISTIC HYSTERESIS OPERATOR	163
<i>G. A. Patterson ; A. Rodriguez-Fernandez ; J. Suñé ; E. Miranda ; C. Cagli ; L. Perniola</i>	
ELECTROCHEMICAL ETCHING OF SILICON WITH SUB-500 NM FEATURE SIZE	167
<i>Didac Vega Bru ; David Cardador Maza ; Ángel Rodríguez Martínez</i>	
GEOMETRY AND BIAS DEPENDENCE OF TRAPPING EFFECTS IN PLANAR GAN NANODIODES	171
<i>H. Sánchez-Martín ; O. García-Pérez ; I. Íñiguez-De-La-Torre ; S. Pérez ; J. Mateos ; T. González ; C. Gaquière</i>	
ELECTROCHEMICAL CHARACTERIZATION OF IONOGEL ACTUATORS.....	175
<i>Nerea Gil-González ; E. Castaño ; T. Akyazi ; F. Benito-Lopez ; T. Akyazi ; F. Benito-Lopez ; M. C. Morant-Miñana</i>	
SILICON NITRIDE LAYERS FOR DOPLA-IBC SOLAR CELLS	179
<i>Jesús A. Méndez ; Isidro Martín ; Gema López ; Pablo Ortega ; Albert Orpella ; Ramón Alcubilla</i>	
DYNAMIC STUDY OF THE GATE OF AN N-MOS MICROFLUIDIC TRANSISTOR FOR COMPUTATIONAL MICROFLUIDICS	183
<i>Emilio Franco ; Francisco Perdigones ; Antonio Luque ; José Manuel Quero</i>	
SPICE SIMULATION OF RRAM CIRCUITS. A COMPACT MODELING PERSPECTIVE	187
<i>G. González-Cordero ; J. B. Roldán ; F. Jiménez-Molinos</i>	
MICROWAVE DETECTION UP TO 43.5 GHZ BY GAN NANODIODES: EXPERIMENTAL AND ANALYTICAL RESPONSIVITY	191
<i>H. Sánchez-Martín ; S. Sánchez-Martín ; O. García-Pérez ; S. Pérez ; J. Mateos ; T. González ; I. Íñiguez-De-La-Torre ; C. Gaquière</i>	
Author Index	