1st International Telecommunication Conference on Advanced Micro- and Nanoelectronic Systems and Technologies 2015

IOP Conference Series: Materials Science and Engineering Volume 151

Moscow, Russia 22 – 23 December 2015

Editors:

V.S. Pershenkov G.I. Zebrev

ISBN: 978-1-5108-3272-5

ISSN: 1757-8981

Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2015) by the Institute of Physics All rights reserved. The material featured in this book is subject to IOP copyright protection, unless otherwise indicated.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact the Institute of Physics at the address below.

Institute of Physics Dirac House, Temple Back Bristol BS1 6BE UK

Phone: 44 1 17 929 7481 Fax: 44 1 17 920 0979

techtracking@iop.org

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

Email: curran@proceedings.com Web: www.proceedings.com

Table of contents

Volume 151

1st International Telecommunication Conference "Advanced Micro- and Nanoelectronic Systems and Technologies" 22–23 December 2015, Moscow, Russia

Accepted papers received: 5 October 2016Published online: 17 November 2016

Preface

011001

OPEN ACCESS

<u>1st International Telecommunication Conference "Advanced Micro- and Nanoelectronic Systems and Technologies"</u>

V S Pershenkov and G I Zebrev

011002 OPEN ACCESS Peer review statement

Papers

012001

OPEN ACCESS

Conversion model of radiation-induced interface-trap buildup and the some examples of its application

V S Pershenkov, A V Sogoyan and V A Telets....1

012002

OPEN ACCESS

Taking into account the space environments variability for prediction of dose response in bipolar devices

I V Elushov and G I Zebrev.....7

The development of ion mobility technology

V V Beliakov, A V Golovin, V K Vasilev, E K Malkin, E A Gromov, I A Ivanov, M A Matusko and D Y Lipatov.....10

012004

OPEN ACCESS

Combined methods of tolerance increasing for embedded SRAM

L A Shchigorev and I I Shagurin....15

012005

OPEN ACCESS

Electrochromic thin-film components for information representation systems

V A Shakhnov, A I Vlasov and S V Tokarev....20

012006

OPEN ACCESS

<u>Multichannel analog front-end and analog-to-digital converter ICs for silicon photomultipliers</u>

Y I Bocharov and V A Butuzov.....26

012007

OPEN ACCESS

Influence of chip temperature on the hydrogen sensitivity of MISFET-based sensors

B I Podlepetsky, A V Kovalenko and M Y Nikiforova.....33

012008

OPEN ACCESS

ELDRS in a wide range of total doses

V S Pershenkov, D V Savchenkov and V A Telets.....37

Competing nucleation of islands and nanopits in zinc-blend Ill-nitride quaternary material system

K M Gambaryan, V M Aroutiounian, A K Simonyan and L S Yeranyan....42

012010

OPEN ACCESS

THORON-SCOUT - first diffusion based active Radon and Thoron monitor

W Wagner, T Streil, V Oeser, G Horak and M Duzynski.....46

012011

OPEN ACCESS

Evaluation performance of digital integrated circuits while exposed to radiation

V M Barbashov and N S Trushkin.....50

012012

OPEN ACCESS

Latch up effect under electromagnetic pulse

V V Shurenkov and D V Gromov.....53

012013

OPEN ACCESS

The comparison of radiation hardness of heterojunction SiGe and conventional silicon bipolar transistors

A S Bakerenkov, V A Felitsyn and A S Rodin.....58

012014

OPEN ACCESS

Linearity analysis of single-ended SAR ADC with split capacitive DAC

Dmitry Osipov, Evgeny Malankin and Vitaly Shumikhin....63

Technology and characteristics of the transistor with a channel based on graphene

S A Shostachenko, G I Zebrev, R V Zakharchenko, S V Leshchev and I V Komissarov.....71

012016

OPEN ACCESS

Prospects for the use of security air flow to prevent ion-molecule reactions in the ionization and drift zone in classical IMS

A V Golovin, N V Makarova, A A Poturuy and V V Beliakov.....74

012017

OPEN ACCESS

Detection heart failures (HF) biomarkers by proton transfer reaction - mass spectrometry and ion mobility spectrometry

Y R Shaltaeva, V K Vasilev, D Y Yakovlev, F Iu Kopylov, A L Syrkin, P Sh Chomakhidze, A A Bykova, L K Malinovskaya and A I Skorokhod.....78

012018

OPEN ACCESS

The investigation of ionization conditions in the trace amounts detection of heterocyclic compounds by ion mobility spectrometry and mass spectrometry

Y R Shaltaeva, A A Sysoev, S S Poteshin, K I Negru, S S Grishin, V V Trefilova, M I Zuev and E P Baberkina.....82

012019

OPEN ACCESS

<u>Techniques</u> and instrumental complex for research of influence of microwaves encoded by brain neural signals on biological objects' psycho physiological state

B V Gurkovskiy, B V Zhuravlev, E M Onishchenko, A B Simakov, N Yu Trifonova and Yu A Voronov.....86

012020

OPEN ACCESS

Miniaturized ceramic platform for metal oxide gas sensors array

N N Samotaev.....93

Light emitting diode absorption spectroscopy for combustible gas monitoring

S S Fanchenko, A M Baranov, A V Savkin and N N Samotaev.....97

012022

OPEN ACCESS

<u>Investigation of cracks formation in sapphire crystals</u>

S P Malyukov, Y V Klunnikova and E.V. Kirillova.....101

012023

OPEN ACCESS

Effect of mono- and bimetallic nanoparticles Fe, Ni, & Fe/Ni based on carbon nanocomposites on electrocatalytic properties of anodes

K Ranabhat, A I Pylinina, K S Skripkin, E A Sofronova, A A Revina, V E Kasatkin, L N Patrikeev and V A Lapshinsky.....104

012024

OPEN ACCESS

Automotive MEMS sensors based on additive technologies

A A Vasiliev, A V Sokolov, A V Pisliakov, K Yu Oblov, N N Samotaev, V P Kim, S V Tkachev, S P Gubin, G N Potapov, Yu V Kokhtina and A V Nisan.....109

012025

OPEN ACCESS

Artifacts caused by microwave radiation in cardiac radio telemetry

A B Simakov, B V Gurkovskiy, E M Onishchenko, N Y Trifonova and D S Veselov.....113

012026

OPEN ACCESS

Radiation hardness improvement of analog front-end microelectronic devices for particle accelerator

A G Miroshnichenko, A S Rodin, A S Bakerenkov and V A Felitsyn.....116

012027
OPEN ACCESS

Simulating nanosecond voltage comparator with improved radiation hardness compatible with PECL logic

A A Lebedev, A E Nazarenko, M S Vakhnenko, V A Komleva and A Y Nikolaev.....122

012028

OPEN ACCESS

Aid system for visually impaired people at spatial orientation

K A Palaguta, A I Krukov, S M Troikov and I S Shubnikova.....126

012029

OPEN ACCESS

High accuracy magnetic field sensors with wide operation temperature range

I S Vasil'evskii, A N Vinichenko, D I Rubakin, I A Bolshakova and N I Kargin.....131

012030

OPEN ACCESS

Thin coatings and films hardness evaluation

V M Matyunin, A Yu Marchenkov, A N Demidov and M A Karimbekov.....135

012031

OPEN ACCESS

Carbon dioxide gas sensor based on optical control of color in liquid indicator

K Yu Oblov, A V Ivanova, S A Soloviev, S V Zhdanov, Yu A Voronov and V V Florentsev.....138

012032

OPEN ACCESS

Maximum power point tracking for optimizing energy harvesting process

S Akbari, P C Thang and D S Veselov.....143

Numerical modeling of perovskite solar cells with a planar structure

S P Malyukov, A V Sayenko and A V Ivanova.....147

012034

OPEN ACCESS

Point-of-load switched-capacitor DC-DC converter for distributed power systems

V E Shunkov, O N Kus, V Y Prokopyev, V A Butuzov, Y I Bocharov and V E Shunkov.....151

012035

OPEN ACCESS

About the choice of initial voltages in the synchronous sense amplifier for CMOS memory

Y M Gerasimov, N G Grigoryev and A V Kobylyatskiy.....157

012036

OPEN ACCESS

<u>Low-power low-jitter PLL clock synthesizer for microprocessors with clock range 200-</u>768 MHz

V Baykov and A Garmash.....161

012037

OPEN ACCESS

Pseudomorphic HEMT quantum well AlGaAs/InGaAs/GaAs with AlAs:δ-Si donor layer

A N Vinichenko and I S Vasil'evskii.....165

012038

OPEN ACCESS

Schematic techniques for improving precision and radiation hardness of current feedback operational amplifiers

A A Lebedev, A E Nazarenko, M S Vakhnenko, I I Liakhchilina, N M Klokov and A A Komlev.....169

Using ionization response maps for SET characterisation in UHF mixers

D V Savchenkov and A G Kuznetsov.....174

012040

OPEN ACCESS

Impact of recombination on heavy ion induced single event upset cross-section

K S Zemtsov, A M Galimov, M E Gorchichko and I V Elushov.....180

012041

OPEN ACCESS

<u>Inner filled constructive material effect on shielding effectiveness of screened electronics</u> in resonance mode

V I Butin and P Ya Kundyshev.....184

012042

OPEN ACCESS

Colloidal quantum dots for fluorescent labels of proteins

P Gladyshev, V Kouznetsov, C Martinez Bonilla, S Dezhurov, D Krilsky, A Vasiliev, O Morenkov, V Vrublevskaya, P Tsygankov, S Ibragimova and A Rybakova.....189

012043

OPEN ACCESS

Finishing technologies for processing of optical microelectronic items

K R Muratov, T R Ablyaz, E A Gashev, A M Khanov and N V Varlamov.....194

012044

OPEN ACCESS

An approach to organic field-effect transistor above-threshold drains current compact modeling that provides monotonic decrease of the output conductance with drain bias increasing

V O Turin, B A Rakhmatov, C H Kim and B Iñiguez.....204

Thermal MEMS flow meter for gaseous working fluids on the basis of the hot-wire thermoanemometric sensor

T A Tsivinskaya, L G Avaeva, P V Grigoriev and S A Mileshin.....209

012046 OPEN ACCESS

Attractor property for terminal manifold in control synthesis problem

A Diveev and E Sofronova.....214