5th International Conference on Materials and Applications for Sensors and Transducers (IC-MAST2015)

IOP Conference Series: Materials Science and Engineering Volume 108

Mykonos, Greece 27 – 30 September 2015

Editors:

Evangelos Hristoforou Dimitrios S. Vlachos

ISBN: 978-1-5108-2227-6

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 108

5th International Conference on Materials and Applications for Sensors and Transducers (IC-MAST2015)
27–30 September 2015, Mykonos, Greece

Accepted papers received: 22 December 2015

Published online: 18 March 2016

Preface

011001 OPEN ACCESS

5th International Conference on Materials and Applications for Sensors and Transducers (IC-MAST2015)

E Hristoforou, D S. Vlachos, I Giouroudi, S Kar-Narayan and S Potirakis

011002 OPEN ACCESS Peer review statement

Papers

012001 OPEN ACCESS

Comparison of different feature reduction methods in the improvement of gas diagnosis of a temperature modulated resistive gas sensor

S M Hosseini-Golgoo and N Ebrahimpour pg. 1

OPEN ACCESS

Formaldehyde gas sensor based on nanostructured nickel oxide and the microstructure effects on its response

D. Lahem, F.R. Lontio, A. Delcorte, L. Bilteryst and M. Debliquy pg. 7

012003

OPEN ACCESS

Nanostructured SnO₂ thick films for gas sensor application: analysis of structural and electronic properties

Goran Miskovic, Obrad S Aleksic, Maria V Nikolic, Johann Nicolics, Goran Radosavljevic, Zorka Z Vasiljevic, Miloljub D Lukovic and Walter Smetana pg. 13

012004

OPEN ACCESS

Copper oxide thin films for ethanol sensing

M Lamri Zeggar, F Bourfaa, A Adjimi, M S Aida and N Attaf pg. 18

012005

OPEN ACCESS

A portable air-quality station based on thick film gas sensors for real time detection of traces of atmospheric pollutants

A Fioravanti, A Bonanno, S Gherardi, M C Carotta and A N Skouloudis pg. 23

012006

OPEN ACCESS

Sensing element for detection of polar organic vapours on the base of polyaniline-composite - Effect of substrate surface area

Robert Olejnik, Dipak Gorakh Babar, Petr Slobodian and Jiri Matyas pg. 27

012007

OPEN ACCESS

Metal composite as backing for ultrasonic transducers dedicated to non-destructive measurements in hostile

R Boubenia, E Rosenkrantz, F Despetis, P P and J-Y Ferrandis pg. 32

OPEN ACCESS

Assessment of Material Properties of Gallium Orthophosphate Piezoelectric Elements for Development of Phased Array Probes for Continuous Operation at 580°C

Mario Kostan, Abbas Mohimi, Channa Nageswaran, Vassilios Kappatos, Liang Cheng, Tat-Hean Gan, Luiz Wrobel and Cem Selcuk pg. 41

012009

OPEN ACCESS

A secure and easy-to-implement web-based communication framework for caregiving robot teams

G Tuna, R Daş, A Tuna, H Örenbaş, M Baykara and K Gülez pg. 50

012010

OPEN ACCESS

<u>Information</u> security threats and an easy-to-implement attack detection framework for wireless sensor network-based smart grid applications

G Tuna, H Örenbaş, R Daş, D Kogias, M Baykara and K K pg. 56

012011

OPEN ACCESS

<u>Physiological parameters monitoring of fire-fighters by means of a wearable wireless sensor system</u>

Stelios M Potirakis, Stelios A Mitilineos, Panagiotis Chatzistamatis, Savvas Vassiliadis, Antonios Primentas, Dimitris Kogias, Emmanouel T Michailidis, Maria Rangoussi, Senem Kurşun Bahadir, Özgür Atalay, Fatma Kalaoğlu and Yusuf Sağlam pg. 64

012012

OPEN ACCESS

Sound-maps of environmentally sensitive areas constructed from Wireless Acoustic Sensors Network data

E. T. Michailidis, J. Liaperdos, N.-A. Tatlas, S. M. Potirakis and M. Rangoussi pg. 73

012013

OPEN ACCESS

Stress state evaluation in low carbon and TRIP steels by magnetic permeability

M.-E. Kouli and M Giannakis pg. 81

012014 OPEN ACCESS

Design and development of a new magnetic sensor for stress measurements

S Aggelopoulos pg. 85

012015

OPEN ACCESS

Correlation of magnetic properties with deformation in electrical steels

S Papadopoulou pg. 89

012016

OPEN ACCESS

<u>Correlation of grain growth phenomena with magnetic properties in non - oriented</u> electrical steels

E Mangiorou pg. 93

012017

OPEN ACCESS

An accurate method for determining residual stresses with magnetic non-destructive techniques in welded ferromagnetic steels

P Vourna pg. 97

012018

OPEN ACCESS

Tin Oxide Microheater for Chemical Sensors

Mohsen Gharesi and Mohammad Ansari pg. 102

012019

OPEN ACCESS

Discriminating among different tea leaves using an operating temperature-modulated tin oxide gas sensor

Ali Rastkhadiv, Amin Jenabi and Asma Souri pg. 109

OPEN ACCESS

Refractive index and extinction coefficient of doped polycrystalline silicon films in infrared spectrum

Xia Zhang and Dacheng Zhang pg. 117

012021

OPEN ACCESS

Biomaterials and therapeutic applications

Angelo Ferraro pg. 122

012022

OPEN ACCESS

Improving sensitivity of the polyurethane/CNT laminate strain sensor by controlled mechanical preload

Petr Slobodian, Robert Olejnik, Jiri Matyas and Dipak Gorakh Babar pg. 126

012023

OPEN ACCESS

<u>Influence of losses on the output voltage of ferrite transformer in case of strong magnetic</u> field in the core

A. Gulbis, D. Malinovska and D. Stepins pg. 131

012024

OPEN ACCESS

High elastic polyurethane/carbon nanotube composite laminate for structure health monitoring by gain shifting of antenna sensing element

Robert Olejnik, Petr Slobodian, Jiri Matyas and Dipak Gorakh Babar pg. 136

012025

OPEN ACCESS

Simple estimation of dipole source z-distance with compact magnetic gradiometer

M Janošek, A Platil and J Vyhnánek pg. 141

OPEN ACCESS

Low-noise magnetic observatory variometer with race-track sensors

M Janošek, V Petrucha and M Vlk pg. 145

012027

OPEN ACCESS

Engineering of composite metallic microfibers towards development of plasmonic devices for sensing applications

A Petropoulou, G Antonopoulos, P Bastock, C Craig, G Kakarantzas, D W Hewak, M N Zervas and C Riziotis pg. 149

012028

OPEN ACCESS

Construction of an AMR magnetometer for car detection experiments

V Fúra, V Petrucha and A Platil pg. 153

012029

OPEN ACCESS

Investigate the magnetic behaviour of thermal treated carbon steel

N P Kanelopoulos pg. 157

012030

OPEN ACCESS

Oxygen adsorption at noble metal/TiO₂ junctions

F. Hossein-Babaei, Navid Alaei-Sheini and Mehdi M. Lajvardi pg. 161

012031

OPEN ACCESS

Ni/TiO₂ Ultraviolet Detector

Mehdi Mohamadzade Lajvardi and Mojtaba Jahangiri pg. 167

012032 OPEN ACCESS

Fast electrochemical actuator

I V Uvarov, A V Postnikov and V B Svetovoy pg. 174

012033

OPEN ACCESS

Ag-doped titanium dioxide gas sensor

Navid Alaei Sheini and Mahsa Rohani pg. 181

012034

OPEN ACCESS

<u>Physico-chemical mechanism for the vapors sensitivity of photoluminescent InP quantum</u> dots

P. Prosposito, R. De Angelis, F. De Matteis, F. Hatami, W.T. Masselink, H. Zhang and M. Casalboni pg. 188

012035

OPEN ACCESS

<u>Topology optimization of 3D compliant actuators by a sequential element rejection and admission method</u>

R Ansola, E Veguería, C Alonso and O M Querin pg. 192

012036

OPEN ACCESS

LED-based NDIR natural gas analyzer

Sergey Fanchenko, Alexander Baranov, Alexey Savkin and Vladimir Sleptsov pg. 205

012037

OPEN ACCESS

<u>Precise sensing and selection of molecules by the interface between the metal nanocluster and the oxide support</u>

S A Khubezhov, I V Silaev, I V Tvauri, G S Grigorkina, Z S Demeev, A.G. Ramonova, D V Kuznetsov, T I Radchenko, T T Magkoev Jr, S Ogura, D Sekiba, K Fukutani and T T Magkoev pg. 212

OPEN ACCESS

Highly sensitive multi-layer pressure sensor with an active nanostructured layer of an organic molecular metal

V Laukhin, V Lebedev, E Laukhina, C Rovira and J Veciana pg. 216

012039

OPEN ACCESS

TiO₂-TiO₂ composite resistive humidity sensor: ethanol crosssensitivity

Milad Ghalamboran and Yasin Saedi pg. 226

012040

OPEN ACCESS

First-principles analysis on Seebeck coefficient in zinc oxide nanowires for thermoelectric devices

K Nakamura pg. 234

012041

OPEN ACCESS

<u>Using granular C0-AI₂O₃</u> spacer for optimization of functional parameters of the FeMn/Fe₂₀Ni₈₀ magnetoresistive films

A N Gorkovenko, V N Lepalovskij, O A Adanakova and V O Vas'kovskiy pg. 243

012042

OPEN ACCESS

Electrochemical measurements on a droplet using gold microelectrodes

Amin Jenabi, Asma Souri and Ali Rastkhadiv pg. 248

012043

OPEN ACCESS

Cyclopean gauge factor of the strain-resistance transduction of indium oxide films

J Ivančo, Y Halahovets, K Végsö, I Klačková, M Kotlár, A Vojtko, M Micušík, M Jergel and E Majková pg. 253

OPEN ACCESS

Open-circuit sensitivity model based on empirical parameters for a capacitive-type MEMS acoustic sensor

Jaewoo Lee, J.H. Jeon, C.H. Je, S.Q. Lee, W.S. Yang and S.-G. Lee pg. 260

012045

OPEN ACCESS

A new expression of Ns versus E_f to an accurate control charge model for AlGaAs/GaAs

I Bouneb and F. Kerrour pg. 270

012046

OPEN ACCESS

Performance analysis of resistive switching devices based on BaTiO₃ thin films

Natasa Samardzic, Tijana Kojic, Jelena Vukmirovic, Djordjije Tripkovic, Branimir Bajac, Vladimir Srdic and Goran Stojanovic pg. 278

012047

OPEN ACCESS

<u>Preparation and Characterization of a PEDOT-Manganese Oxide Composite, and Its</u> Application to Electrochemical Sensing

A. Arena pg. 282

012048

OPEN ACCESS

Deposition of Co-doped TiO₂ Thin Films by sol-gel method

A Boutlala, F Bourfaa, M Mahtili and A Bouaballou pg. 288

012049

OPEN ACCESS

<u>Investigation of photocalalytic activity of ZnO prepared by spray pyrolis with various precursors</u>

F Bourfaa, M Lamri Zeggar, A A, M S Aida and N Attaf pg. 293

012050 OPEN ACCESS

Attractive mechanical properties of a lightweight highly sensitive bi layer thermistor: polycarbonate/organic molecular conductor

E Laukhina, V Lebedev, C Rovira, V Laukhin and J Veciana pg. 299