

International Conference on Functional Materials and Nanotechnologies

(FM&NT 2012)

**IOP Conference Series: Materials Science and
Engineering Volume 38**

**Riga, Latvia
17 – 20 April 2012**

**ISBN: 978-1-63439-849-7
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© by the Institute of Physics
All rights reserved.

Printed by Curran Associates, Inc. (2015)

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: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

MAGNESIUM NANOPARTICLES FOR HYDROGEN STORAGE: STRUCTURE, KINETICS AND THERMODYNAMICS	1
<i>L Pasquini, M Brighi, A Montone, M V Antisari, B Dam, V Palmisano, E Bonetti</i>	
SCINTILLATING CERAMICS BASED ON ZINC OXIDE	9
<i>P A Rodnyi, E I Gorokhova, K A Chernenko, I V Khoduk</i>	
SPIN-ORBIT GAPS IN ARMCHAIR NANOTUBES CALCULATED USING THE LINEAR AUGMENTED CYLINDRICAL WAVE METHOD	16
<i>P D'Yachkov, D Kutlubaev</i>	
AB-INITIO STUDY OF METAL-ZIRCONIA INTERFACES	24
<i>S Kulkova, A Bakulin, S Hocker, S Schmauder</i>	
AB INITIO SIMULATIONS ON RUTILE-BASED TITANIA NANOWIRES	31
<i>Yu F Zhukovskii, R A Evarestov</i>	
FLUORESCENCE OF TiO₂:SM³⁺ COMPOSITE STIMULATED BY PLASMON WAVES	37
<i>L Dolgov, V Kiisk, S Pikker, A Loot, I Sildos</i>	
LOW-ENERGY CHARGE TRANSFER EXCITATIONS IN NiO	43
<i>V I Sokolov, V A Pustovarov, V N Churmanov, V Yu Ivanov, A Ye Yermakov, M A Uimin, N B Gruzdev, P S Sokolov, A N Baranov, A S Moskvina</i>	
VIBRATIONAL SPECTRA OF OPAL-BASED PHOTONIC CRYSTALS	49
<i>G Dovbeshko, O Fesenko, V Boyko, V Romanyuk, V Moiseyenko, V Gorelik, L Dolgov, V Kiisk, I Sildos</i>	
PROCESSING OF AMORPHOUS Si BY PULSED LASER IRRADIATION AT DIFFERENT WAVELENGTHS	55
<i>J Butikova, G Marcins, B Polyakov, A Muhins, A Voitkans, I Tale</i>	
MAGNETIC PROPERTIES OF CARBON NANOPARTICLES	61
<i>E Lähderanta, A V Lashkul, K G Lisunov, D A Zhrebtsov, D M Galimov, A N Titkov</i>	
HOLOGRAPHIC STUDIES OF PHOTOINDUCED ANISOTROPY IN MOLECULAR GLASSY FILMS CONTAINING DIPHENYLAMINE AZOCHROMOPHORES	68
<i>A Ozols, V Kokars, P Augustovs, K Traskovskis, D Saharov</i>	
OPTICAL FIELD-INDUCED SURFACE RELIEF FORMATION ON CHALCOGENIDE AND AZO-BENZENE POLYMER FILMS	74
<i>J Teteris, U Gertners</i>	
INFLUENCE OF SPECIFIC AND NON-SPECIFIC SOLVENT EFFECTS ON FRONTAL MO OF DMABI SYSTEM	80
<i>V Kampars, P Pastors, G Ornicane</i>	
INVESTIGATION OF CHEMICAL BONDING AT METAL-CERAMIC INTERFACES	86
<i>A Bakulin, S Kulkova, S Hocker, S Schmauder</i>	
THE EFFECT OF ZN VACANCIES AND GA DOPANTS ON THE ELECTRONIC STRUCTURE OF ZNO: AB INITIO SIMULATIONS	90
<i>A V Sorokin, Y F Zhukovskii, J Purans, E A Kotomin</i>	
THE ROLE OF NANOPOWDER PARTICLE SURFACES AND GRAIN BOUNDARY DEFECTS IN THE SINTERING OF ZNO CERAMICS	94
<i>F Muktepavela, R Zabels, V Sursajeva, L Grigorjeva, K Kundzins</i>	
SHEAR BANDING MECHANISM OF PLASTIC DEFORMATION IN LiF IRRADIATED WITH SWIFT HEAVY IONS	98
<i>J Maniks, R Zabels, I Manika</i>	
DIMENSIONAL EFFECTS OF SAMPLE GEOMETRY AND MICROSTRUCTURE OF MNZN AND NiZN FERRITES	103
<i>J Jankovskis, N Ponomarenko, N Mironova-Ulmane, D Jakovlevs</i>	
CHARACTERIZATION OF LiFePO₄/C COMPOSITE THIN FILMS USING ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY	107
<i>G Bajars, G Kucinskis, J Smits, J Kleperis, A Lusiš</i>	
STUDY THE EFFECTS OF MOISTURE CONTENT ON THE ELECTRICAL PROPERTIES OF TECHNICAL TEXTILES BY IMPEDANCE SPECTROSCOPY	112
<i>A Lusiš, E Pentjuss, G Bajars, J Gabrusenoks, R Janeliukštis, J Zandersons</i>	
ELECTROCHEMICAL IMPEDANCE AND MOISTURE CONTENT OF GLASS FABRIC	117
<i>E Pentjuss, A Lusiš, G Bajars, J Gabrusenoks, L Jekabsone</i>	

COTTON FABRIC SURFACE MODIFICATION BY SOL-GEL DEPOSITION OF ZNO THIN FILMS	121
<i>S Vihodceva, S Kukle</i>	
PREPARATION AND CHARACTERIZATION OF CNT/TIO₂ BASED TRANSPARENT FIBER ELECTRODES	126
<i>M Paalo, T Tätte, M Hussainov, K Hanschmidt, M Lobjakas, A Lõhmus, U Mäeorg, I Kink</i>	
PSEUDOISOCROMATIC TEST PLATE COLOUR REPRESENTATION DEPENDENCE ON PRINTING TECHNOLOGY	130
<i>K Luse, S Fomins, M Ozolinsh</i>	
THE EXPRESSION OF CYTOKINES AND β-DEFENSIN 2, -3, -4 IN RABBIT BONE TISSUE AFTER HYDROXYAPATITE (HAP), α-TRICALCIUM PHOSPHATE (α-TCP) AND POLYMETHYLMETHACRYLATE (PMMA) IMPLANTATION	134
<i>J Vanze, M Pilmane, A Skagers</i>	
THE IMPACT OF LIGHT POLARIZATION ON THE DIRECT RELIEF FORMING PROCESSES IN AS₂S₃ THIN FILMS	138
<i>U Gertners, J Teteris</i>	
UV OPTICAL RECORD AND ELECTRON BEAM LITHOGRAPHY IN POLYMER FILMS	142
<i>A Gerbreders, O Shimane, V Kolobjonoks, J Teteris</i>	
PHOTOINDUCED PHENOMENA IN AZO-DYED GELATINE FILMS	146
<i>J Aleksejeva, J Teteris</i>	
IRON COMPLEXES EMBEDDING INFLUENCE ON PMAA HYDROGEL	150
<i>L Khenkin, T Baluyan, A Novakova, I Rebrin, E Makhaeva</i>	
MECHANICAL, STRUCTURAL AND MAGNETIC PROPERTIES OF POLYPROPYLENE/IRON FERRITE MAGNETIC NANOCOMPOSITES	155
<i>I Reinholds, V Kalkis, J Zicans, R Merijs Meri, A Grigalovica, M Maiorov</i>	
SYNTHESIS HIGHLY ACTIVE PLATINUM TRI-METALLIC ELECTROCATALYSTS USING "ONE-STEP" ORGANOMETALLIC CHEMICAL VAPOUR DEPOSITION TECHNIQUE FOR METHANOL OXIDATION PROCESS	159
<i>Q-L Naidoo, S Naidoo, L Petrik, A Nechaev, P Ndungu, G Vaivars</i>	
FORMATION OF NANOSIZED STRONTIUM SUBSTITUTED HYDROXYAPATITES	164
<i>K A Gross, A Jeršova, D Grossin, C Rey, A Viksna</i>	
ROLE OF PARAMAGNETIC POLYCONJUGATED CLUSTERS IN LIGNIN ANTIOXIDANT ACTIVITY (IN VITRO)	169
<i>T Dizhbite, J Ponomarenko, A Andersone, G Dobelev, M Lauberts, J Krasilnikova, N Mironova-Ulmane, G Telysheva</i>	
NONLINEAR OPTICAL PROPERTIES OF LOW MOLECULAR ORGANIC GLASSES FORMED BY TRIPHENYL MODIFIED CHROMOPHORES	173
<i>A Tokmakovs, M Rutkis, K Traskovskis, E Zarins, L Laipniece, V Kokars, V Kampars</i>	
HYPER-RAYLEIGH SCATTERING AND TWO-PHOTON LUMINESCENCE OF PHENYLAMINE-INDANDIONE CHROMOPHORES	177
<i>I Mihailovs, J Kreicberga, V Kampars, S Miasojedovas, S Juršenas, L Skuja, M Rutkis</i>	
MULTISCALE APPROACH TO THE STRUCTURE AND SPECTRA OF NILE RED ADSORBED ON POLYSTYRENE NANOPARTICLES	184
<i>A Freidzon, V Tikhomirov, A Odinokov, A Bagaturyants</i>	
NEAR-BAND LUMINESCENCE OF CDZnTe DETECTOR CRYSTALS	190
<i>L Grigorjeva, D Millers, V Ivanov, L Aleksejeva</i>	
SYNTHESIS OF CUBIC AND HEXAGONAL NaYF₄:Er³⁺	195
<i>A Sarakovskis, M Voss, G Doke, D Jankovica, J Grube</i>	
STABILITY OF COLOR CENTERS IN LiYF₄ CRYSTALS AT LOW TEMPERATURES	199
<i>V M Lisitsyn, Y V Bikhert, V I Korepanov, L A Lisitsyna, A K Dauletbekova, A T Akylbekov, V M Reiterov</i>	
COLOR CENTERS AND STRUCTURAL DAMAGE IN LiF INDUCED BY 150 MEV KR IONS	205
<i>A Rusakova, J Maniks, K Schwartz, A Dauletbekova, A Akilbekov, V Lisitsin, M Zdorovets</i>	
AB INITIO CALCULATIONS OF THE H CENTERS IN MGF₂ CRYSTALS	210
<i>F U Abuova, A T Akilbekov, E A Kotomin</i>	
FLUCTUATIONS IN AN INORGANIC GLASS FORMING SYSTEM CAPABLE OF LIQUID-LIQUID PHASE SEPARATION	214
<i>V Bogdanov, L Maksimov, A Anan'Ev, S Nemilov, V Rusan</i>	
MEASUREMENTS OF SiO₂ GLASS SURFACE PARAMETERS BY METHODS OF MICROSCOPY	218
<i>E Gavars, A Svagere, A Skudra, N Zorina, R Poplauskis</i>	
OPTICAL PROPERTIES OF IRRADIATED YTTRIUM ALUMINUM GARNET	222
<i>V Skvortsova, N Mironova-Ulmane</i>	

THE LUMINESCENT PROPERTIES OF PERSISTENT STRONTIUM ALUMINATE PHOSPHOR PREPARED BY SOLAR INDUCED SOLID STATE SYNTHESIS.....	226
<i>V Liepina, K Smits, D Millers, L Grigorjeva, C Monty</i>	
EPR SPECTRA OF THE MN²⁺ ION IN THE OXYFLUORIDE GLASS CERAMICS CONTAINING BAF₂ NANOCRYSTALLINE PHASE	231
<i>Dz Berzins, A Fedotovs, O Kiselova, A Sarakovskis</i>	
CHARACTERISTICS OF THE MN²⁺ EPR SPECTRA IN THE OXYFLUORIDE GLASS CERAMICS CONTAINING SRF₂ NANOCRYSTALS.....	235
<i>A Fedotovs, Dz Berzins, O Kiselova, A Sarakovskis</i>	
WORK FUNCTION OF COLLOIDAL SEMICONDUCTING NANOCRYSTALS MEASURED BY KELVIN PROBE.....	239
<i>P Kulis, J Butikova, B Polyakov, G Marcins, J Pervenecka, K Pudzs, I Tale</i>	
DEPOSITION OF CU NANOPARTICLES ON THE SURFACE OF METALLIC ALUMINUM.....	243
<i>A Lescinskis, J Katkevics, D Erts, A Viksna</i>	
ZIRCONIA NANOCRYSTALS AS SUBMICRON LEVEL BIOLOGICAL LABEL.....	248
<i>K Smits, J Liepins, M Gavare, A Patmalnieks, A Gruduls, D Jankovica</i>	
STRUCTURE OF NANOPOROUS CARBON MATERIALS FOR SUPERCAPACITORS.....	252
<i>A Volperts, N Mironova-Ulmane, I Sildos, D Vervikishko, E Shkolnikov, G Dobele</i>	
SYNTHESIS OF SILICA-CARBON NANOTUBE COMPOSITE MATERIALS AND THEIR APPLICATION FOR LASER SYSTEMS	257
<i>J Pilipavicius, D Sakalauskas, A Beganskiene, A Kareiva</i>	
THE EFFECT OF NANOSIZE ZNO ON THE PROPERTIES OF THE SELECTED POLYMER BLEND COMPOSITES	261
<i>A Grigalovica, I Bochkov, R M Meri, J Zicans, J Grabis, R Kotsilkova, I Borovanska</i>	
CARRIER DYNAMICS IN EPILAYERS AND NANOCOLUMNS OF TERNARY ALGAN WITH A TUNABLE BANDGAP	265
<i>R Aleksiejunas, P Šcajev, S Nargelas, S Miasojedovas, K Jarašimas, L Trinkler, J Grigorjeva, B Berzina, K H Chen, Y T Chen, M W Chen, L C Chen</i>	
INVESTIGATION OF ELECTRIC PROPERTIES OF NANOCOMPOSITES IN FREQUENCY DOMAIN - COMPACT MEASUREMENT DATA REPRESENTATION	270
<i>I Matiss, E Pentjušs, O Krievs, J Zicans</i>	
STRUCTURE ANALYSIS AND SIZE DISTRIBUTION OF PARTICULATE MATTER FROM CANDLES AND KEROSENE COMBUSTION IN BURNING CHAMBER.....	274
<i>M Baitimirova, A Osite, J Katkevics, A Viksna</i>	
AB INITIO MODELING OF SULPHUR DOPED TIO₂ NANOTUBULAR PHOTOCATALYST FOR WATER-SPLITTING HYDROGEN GENERATION	278
<i>O Lisovski, S Piskunov, Y F Zhukovskii, J Ozolins</i>	
AB INITIO MODELLING OF UN GRAIN BOUNDARY INTERFACES.....	283
<i>E A Kotomin, Yu F Zhukovkii, D Bocharov, D Gryaznov</i>	
PREPARATION AND PHOTOACTIVITY OF ELECTROPHORETIC TIO₂ COATING FILM.....	287
<i>I Liepina, G Bajars, J Gabrusenoks, L Grinberga, J Kleperis, A Lusiš</i>	
HYDROGEN ADSORPTION IN ZEOLITE STUDIED WITH SIEVERT AND THERMOGRAVIMETRIC METHODS	291
<i>P Lesnicenoks, A Sivars, L Grinberga, J Kleperis</i>	
THRESHOLD CHARACTER OF TEMPERATURES ON DEUTERIUM THERMAL DESORPTION IN MG-V COMPOSITE GROWN ATOM-BY-ATOM.....	297
<i>I M Neklyudov, O M Morozov, V G Kulish, V I Zhurba, A G Galitskiy, N S Lomino, A S Kuprin, V D Ovcharenko, E N Reshemyak</i>	
EPM FINE-DISPERSE PLATINUM COATING ON POWDER CARRIERS	301
<i>V Serga, L Kulikova, A Cvetkov, A Krumina</i>	
THE MEASUREMENT OF IMPURITIES IN SILICON FOR SOLAR CELL PRODUCTION.....	305
<i>G Kolosovska, A Viksna, G Chikvaidze, A Osite, A Opalais</i>	
PROPERTIES OF THE NAFION MEMBRANE IMPREGNATED WITH HYDROXYL AMMONIUM BASED IONIC LIQUIDS.....	309
<i>V Garaev, J Kleperis, S Pavlovica, G Vaivars</i>	
Author Index	