

**13th CONFERENCE for
YOUNG SCIENTISTS in CERAMICS**

**PROGRAMME
and
BOOK OF ABSTRACTS**

**October 16-19, 2019
Novi Sad, Serbia**

Programme and Book of Abstracts of The 13th Conference for Young Scientists in Ceramics (CYSC-2019) publishes abstracts from the field of ceramics, which are presented at traditional international Conference for Young Scientists in Ceramics.

Editors-in-Chief

Prof. Dr. Vladimir V. Srdić

Publisher

Faculty of Technology, University of Novi Sad
Bul. cara Lazara 1, 21000 Novi Sad, Serbia

For Publisher

Prof. Dr. Biljana Pajin

Printing layout

Vladimir V. Srdić, Marija Milanović, Ivan Stijepović

Press

SLUŽBENI GLASNIK, Beograd

CIP – Каталогизација у публикацији
Библиотека Матице српске, Нови Сад

666.3/.7(048.3)

CONFERENCE for Young Scientists in Ceramics (13 ; 2019 ; Novi Sad)

Programme and book of abstracts / 13th Conference for Young Scientists in Ceramics (CYSC-2019), October 16-19, 2019, Novi Sad ; [editor-in-chief Vladimir V. Srdić]. - Novi Sad : Faculty of Technology, 2019 (Beograd : Službeni glasnik). - XX, 152 str. : ilustr. ; 24 cm

Tiraž 180. - Registar.

ISBN 978-86-6253-104-9

a) Керамика - Технологија - Апстракти
COBISS.SR-ID 331006727



The Book of Abstracts of the 13th Conference for Young Scientists in Ceramics
is licensed under a
[Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/)

Preface

Dear conference participants and readers we have the pleasure to once again welcome you all to Novi Sad, Serbia as the venue for the 13th Conference for Young Scientists in Ceramics. This year again the event is jointly organized by the Faculty of Technology Novi Sad, University of Novi Sad and the Young Ceramists Network (YCN) of the European Ceramic Society.

The Conference for Young Scientists in Ceramics, previously known as the Students' Meeting, is the conference with more than twenty years of tradition. It grew from the Serbian only conference in 1998 to the truly international event with participants coming from 31 different countries from all over the world. The one important thing that did not change from the beginning is the basic concept which has always been the promotion of young stage researchers and their achievements. Every two years the Conference becomes the place where young MSc and PhD students and young doctors meet to exchange their ideas, make new networks and share their knowledge of the topics covering ever expanding field of ceramics. Beside 134 oral presentations given by their peers, the young scientists will have the opportunity to hear 14 invited talks and 1 plenary lecture of the more experienced scientists and experts. The presented topics include many important scientific issues and cutting edge results in ceramics ranging from the theoretical and modelling results over the experimental structural and functional characterizations all the way to the applicative examples and industrial scale production of ceramic materials. In this way, all participants will have the chance to expand their knowledge and strengthen their basic understanding of the various branches of ceramics science covering advance materials, ceramic composites and traditional ceramics. It is important to mention that this year, for the first time, we will have the student competition for the best oral presentation of a young researcher. There will be three awards which are dedicated to the late Prof. Dr. Paolo Nanni.

We want to use this opportunity to thank our sponsors and co-organizers for helping us to successfully prepare the Conference. First of all, we want to thank the JECS Trust Fund of the European Ceramic Society for their strong financial support. Also, we want to mention that the Serbian Ministry of education, science and technological development recognized our conference as an important event and gave their financial endorsement. The financial part of the awards for three best presentations dedicated to Prof. Nanni was sponsored by Prof. Liliana Mitoseriu from University of Iasi, Romania. At the end, we would like to thank to all the people in the local organizing committee and colleagues from YCN who participated in the preparations of the Conference.

Editor

LIST OF SPONSORS



The European Ceramic Society



The JECS Trust Fund



*Ministry of Education and Science,
Republic of Serbia*

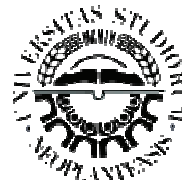


*Provincial Secretariat for Science and
Technological Development*

LIST OF ENDORSERS



Faculty of Technology



University of Novi Sad



Novi Sad European youth capital - OPENS



Tourist organization city of Novi Sad

“European youth Capital – Novi Sad 2019” – adding colors to the city

Novi Sad is a small, but compact city in the heart of the Vojvodina region. This vivid city with over 80,000 young people will surprise you with its transformative energy, multi-nationality and cultural diversity. For centuries, Novi Sad has been a pioneer and symbol of youth activism, making significant social changes in the history and systematic youth care. But, the 2019 is the year when Novi Sad is European Youth Capital. With OPENS Programme Novi Sad is creating more opportunities for youth by youth, empowering them to become pro-active initiators of positive changes, introducing innovative ideas not only in Novi Sad, but also at national and international level.

We have addressed the needs aiming to improve young people's lives, to increase participation in the social-political process with a strong feeling of ownership of the development of the city. Young people are directly engaged in programs creation when it comes to youth activities, as well as in their implementation.

There is no fixed pattern previously established based on which one could dance through the whole project of the European Youth Capital. Each city tells its own story. At the same time, this is where the excitement of the challenge lies. At the moment, OPENS, within the existing system, is breaking new grounds towards the construction of a new system in order to make a radical change in innovative ideas.

Perhaps you would not say if led only by first impressions, history or architecture that Novi Sad is a city of young people. As a perfect blend of modern and traditional, openness and tolerance, this city has inspired more than 400,000 people to express themselves through different activities. Each month Novi Sad puts on a new color and becomes over and over again the host of a number of festivals, fairs and celebrations, aimed first of all, at young people. And now, at every corner, you can find the traces of history and blend of cultures. The city whose rhythm you must hear to be able to feel it. The city which celebrates the diversity, energy and activism of young people! This is the city led by young people, students, artists. The city for curious, dynamic and motivating people. This is the city you wish to experience! And this is the European youth capital

At the moment, Novi Sad is on the doorstep of becoming the center in which young people have the main say. If young people are to inherit the Earth, our role and our final goal is not only to be led by this saying, but to make it happen as well.



Photo by Vladimir Velickovic, Omladinska prestonica Evrope Novi Sad 2019

Novi Sad European youth capital - OPENS

Organizer

- *Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Novi Sad, Serbia*
- *Young Ceramists Network, The European Ceramic Society*

Scientific Committee

Carmen Baudin	<i>Instituto de Cerámica y Vidrio-CSIC, Madrid, Spain</i>
Subramshu S. Bhattacharya	<i>Indian Institute of Technology, Madras, India</i>
Jon Binner	<i>University of Birmingham, United Kingdom</i>
Davide Bossini	<i>Technical University Dortmund, Germany</i>
Francis Cambier	<i>Belgian Ceramic Research Center, Mons Belgium</i>
Dragan Damjanović	<i>Ecole Polytechnique Fédérale de Lausanne, Switzerland</i>
Horst Hahn	<i>Forschungszentrum Karlsruhe, Germany</i>
Andraž Kocjan	<i>Jožef Stefan Institute Ljubljana, Slovenia</i>
Akos Kukovecz	<i>University of Szeged, Hungary</i>
Anne Leriche	<i>University of Valenciennes & Hainaut-Cambresis, France</i>
Karel Maca	<i>Brno University of Technology, Czech Republic</i>
Branko Matović	<i>Institute for Nuclear Sciences "Vinca", Serbia</i>
Marija Milanović	<i>University of Novi Sad, Serbia</i>
Liliana Mitoseriu	<i>University "Al. I. Cuza", Romania</i>
Zbigniew Pedzich	<i>AGH, University of Science and Technol, Krakow, Poland</i>
Mitar Perusic	<i>University of East Sarajevo, Bosnia & Herzegovina</i>
Laura Silvestroni	<i>CNR-ISTEC, Faenza, Italy</i>
Alexandre Simões	<i>Universidade Estadual Paulista UNESP, Brazil</i>
Vladimir Srdić	<i>University of Novi Sad, Serbia</i>
Biljana Stojanović	<i>University of Belgrade, Serbia</i>
Paula Vilarinho	<i>University of Aveiro, Portugal</i>
Kjell Wiik	<i>Norwegian University Sci. & Technol., Trondheim, Norway</i>
Louis A.J.A. Winnubst	<i>University of Twente, The Netherlands</i>
Markus Winterer	<i>University of Duisburg-Essen, Germany</i>

Secretary

Ivan Stijepović *University of Novi Sad, Serbia*

Organizing Committee

Branimir Bajac	<i>University of Novi Sad, Serbia</i>
Elvira Đurđić	<i>University of Novi Sad, Serbia</i>
Saša Lukić	<i>University Duisburg Essen, Germany</i>
Nikola Kanas	<i>Norwegian University Sci. & Technol., Trondheim, Norway</i>
Nemanja Martić	<i>University of Erlangen, Germany</i>
Andrea Nesterović	<i>University of Novi Sad, Serbia</i>
Stevan Ognjanović	<i>University Duisburg Essen, Germany</i>
Jovana Stanojev	<i>University of Novi Sad, Serbia</i>
Đordije Tripković	<i>Forschungszentrum Karlsruhe, Germany</i>
Jelena Vukmirović	<i>University of Novi Sad, Serbia</i>

Content

PROGRAMME

Wednesday, October 16, 2019	2
Thursday, October 17, 2019	5
Friday, October 18, 2019	9
Saturday, October 19, 2019	13

PLENARY and INVITED LETURES

J.-O. Durand MESOPOROUS SILICA, PERIODIC MESOPOROUS ORGANOSILICA, AND MESOPOROUS SILICON NANOPARTICLES FOR DRUG DELIVERY AND TWO- PHOTON PHOTODYNAMIC THERAPY	18
M. Winterer LEARNING ABOUT NANOPARTICLES BY X-RAY ABSORPTION SPECTROSCOPY	19
Á. Kukovecz KEY ELEMENTS OF A SUCCESSFUL H2020 MARIA-SKODOWSKA CURIE – INDIVIDUAL FELLOWSHIP APPLICATION	20
L. Kozielski MECHANO-LUMINESCENT MATERIALS FOR DIRECT CONVERSION OF MECHANICAL ENERGY INTO LIGHT	20
J. Binner DESIGNING THE PROCESSING OF ADVANCED CERAMICS AND COMPOSITES TO YIELD THE REQUIRED PROPERTIES	22
P.M. Vilarinho ALTERATIVE SINTERING ROUTES OF ELECTROCERAMICS: THE CASE OF SODIUM POTASSIUM NIOBATE, A LEAD FREE PIEZOELECTRICS	22
D. Bossini ULTRAFast OPTICAL CONTROL OF MAGNETISM IN SOLIDS	23

I. Djerdj, S. Urban, P. Dolcet, L. Chen, M. Möller, O. Khalid, H. Camuka, R. Ellinghaus, C. Li, S. Gross, P.J. Klar, B. Smarsly, H. Over THE APPLICATION OF Ce-Zr-O COMPOUNDS IN HCl OXIDATION AND INTHREE-WAY CATALYSIS	24
V. Buscaglia, M.T. Buscaglia, G. Canu SIZE AND SCALLING EFFECTS IN FERROELECTRIC CERAMICS	25
J.U. Nandhini, A. Sarkar, P. Arivazhagan, L. Velasco, H. Hahn, S.S. Bhattacharya PHASE-PURE MULTICOMPONENT EQUIMOLAR OXIDES AS A NOVEL CLASS OF FUNCTIONAL MATERIALS: SYNTHESIS, CHARACTERIZATION AND PROPERTIES	26
L. Silvestroni THE IMPORTANCE OF TEM ANALYSES FOR THE DEVELOPMENT OF UHTCs	27
N. Knežević CORE/SHELL MESOPOROUS SILICA AND ORGANOSILICA NANOPARTICLES: SYNTHESIS, CHARACTERIZATION AND APPLICATION IN TARGETED CANCER TREATMENT	28
P.M. Vilarinho HOW TO TALK SCIENCE ... clearly	28
C. Leonelli THE MAGIC OF HIGH POWER MICROWAVE PROCESSING OF CERAMIC MATERIALS	29
N. Kanas, M.-A. Einarsrud, K. Wiik OXIDE THERMOELECTRICS – CURRENT STATUS AND FUTURE PROSPECTS	30

ORAL PRESENTATIONS

A. Levish, M. Winterer IRON(III)ACETYLACETONATE VAPOR STUDIED BY X-RAY ABSORPTION ...	34
T.S.R.C. Murthy, V. Venkatachalam, J. Zou, J. Binner SOL-GEL-BASED INTERFACIAL COATINGS OF RARE EARTH OXIDES ON 2.5D CARBON FIBRE PREFORMS	35
R. Nicola, C. Ianăși, M. Picioruș, S. Ilieș, A.-M. Putz, R. Lazău, A. Ercuța MAGNETIC NANOCOMPOSITES CONTAINING IRON OXIDE@SiO ₂ OBTAINED VIA CONVENTIONAL OR ULTRASONIC METHOD	36
J. Aleksić, T. Barudžija, D. Jugović, M. Mitrić, M. Bošković, Z. Jagličić, S. Gyergyek, Lj. Kostić SYNTHESIS, STRUCTURAL AND MAGNETIC PROPERTIES OF Y _{1-x} Yb _x F ₃ SOLID SOLUTION	37

J. Schulte, J. Geiss, M. Winterer LASER-FLASH-EVAPORATION OF SOLID METAL ORGANIC PRECURSORS	38
I. Milenković, K. Radotić, B. Matović, M. Prekajski, L. Živković, V. Beškosi COATING OF CERIUM OXIDE NANOPARTICLES WITH DIFFERENT CARBOHYDRATES AND THEIR APPLICATION ON PLANTS	39
J. Zygmuntowicz, P. Piotrkiewicz, W. Kaszuwara PROCESSING AND CHARACTERIZATION OF Al ₂ O ₃ -Cu-Ni COMPOSITES	39
M. Wachowski, L. Śnieżek, W. Kaszuwara, K. Konopka, J. Zygmuntowicz EFFECT OF METAL PARTICLES SIZE ON MICROSTRUCTURE OF ZrO ₂ -Ni COMPOSITE FABRICATED BY CSC IN MAGNETIC FIELD	40
K. Dudek, M. Dulski, A. Nowak FABRICATION AND CHARACTERIZATION OF MULTI-FUNCTIONAL HYBRID LAYERS ON NiTi SHAPE MEMORY ALLOY	41
M. Vukšić, I. Žmak, L. Ćurković INFLUENC OF THE ADDITION OF WASTE ALUMINA POWDER ON MECHANICAL PROPERTIES OF ALUMINA CERAMICS	42
I. Nomel, O. Durand-Panteix, L. Boyer, P. Marchet PREPARATION OF ZnO DISPERSIONS SUITABLE FOR SENSORS FABRICATION USING INKJET PRINTING	42
J. Stanojević, B. Bajac, J. Matovic, V.V. Srdic PROCESSING OF NANOSTRUCTURED CNT-BASED THIN FILM ELECTRODE	43
E. Eray, G. Magnacca, V. Boffa, V. Candelario NEW GENERATION SILICON CARBIDE MEMBRANES FOR WATER PURIFICATION	44
A. Policicchio, A.-M. Putz, S. Stelitano, C. Ianăși, G. Conte, R.G. Agostino ORGANICALLY FUNCTIONALISED MESOPOROUS SILICA SYNTHESIZED FOR HYDROGEN STORAGE APPLICATION	45
P.F. Großmann, C. Troll, B. Rieger DIRECT INK WRITING AS AN ADDITIVE MANUFACTURING TECHNIQUE FOR SHAPING HETEROGENEOUS CATALYSTS	46
Á. Szamosvölgyi, A. Sági, Á. Kukovecz, Z. Kónya EXAMINATION OF THE ROLE AND BEHAVIOUR OF MESOPOROUS SUPPORT MATERIALS IN CO ₂ HYDROGENATION	46
G. Conte, A. Policicchio, A.-M. Putz, C. Ianăși, S. Stelitano, R.G. Agostino THE HYDROGEN STORAGE CAPACITY OF ORGANICALLY FUNCTIONALISED MESOPOROUS SILICA	47
A.-M. Putz, A. Policicchio, R.G. Agostino, S. Stelitano, G. Conte, C. Ianăși ORGANICALLY FUNCTIONALISED MESOPOROUS SILICA WITH GAS STORAGE PROPERTIES: SYNTHESIS AND CHARACTERIZATION	48

J. Mrówka, J. Partyka, M. Hasik THERMAL PROPERTIES AND CERAMIC YIELD OF POROUS POLY(METHYL- VINYLSILOXANE) CROSS-LINKED WITH 1,3,5,7-TETRAMETHYLCYCLO- TETRASILOXANE BEFORE AND AFTER DEPOSITION OF PALLADIUM NANOPARTICLES	49
E. İşlek, H.B. Poyraz, M. Polat, İ.Ö. Özer NANO-SIZED MGDNESIUM SPINEL POWDERS SYNTHESIZED VIA FLAME SPRAY PYROLYSIS	50
V. Mackert, M. Winterer PROBING SONICATION OF COLLOIDAL SnO ₂ BY <i>IN SITU</i> SMALL-ANGLE X- RAY SCATTERING	51
B. Özdemir, N. Canikoğlu SYNTHESIS OF TITANIUM NITRIDE POWDER FROM RUTILE AND ANATASE	51
M. Temnikova, A. Glukharev, O. Kurapova, V. Konakov SYNTHESIS, PHASE COMPOSITION AND MICROSTRUCTURE OF ZrO ₂ -Y ₂ O ₃ - rGO COMPOSITE PRECURSORS OBTAINED BY SOL-GEL SYNTHESIS	52
D.A. Rayan, M.A. Zayed, G. Mahmoud COMAPARATIVE STUDY OF La AND Zn IONS CO-DOPED MAGNETITE NANOSTRUCTURES SYNTHESIZED IN OXYGEN AND INERT ATMOSPHERE .	53
J. Geiss, M. Winterer STRUCTURAL CHARACTERIZATION OF LaFeO ₃ PEROVSKITE NANOPARTICLES	54
I. Dinic, M. Vukovic, P. Vulic, M. Nikolic, L. Mancic, O. Milosevic EFFECTS OF CITRIC ION ON HEXAGONAL NaYF ₄ : Yb/Er PHASE FORMATION DURING SOLVOTHERMAL SYNTHESIS	54
S. Hříbalová, W. Pabst LIGHT SCATTERING IN TRANSPARENT CERAMICS: USE AND VALIDITY OF MIE THEORY APPROXIMATIONS	55
Y.H. Elbashar, D.A. Rayan COLOR AND OPTICAL SPECTROSCOPIC ANALYSIS OF Cu ₂ O-K ₂ O-ZnO-P ₂ O ₅ GLASS MATRIX	56
D. Danilović, D.K. Božanić, R. Dojčilović, V.Vodnik, A. Milosavljević, C. Nicolas², L. Nahon, G.G. Macias, V. Djoković PHOTOEMISSION SPECTROSCOPY ON ISOLATED SILVER-BASED HYBRID NANOSTRUCTURES: A NOVEL APPROACH TO UNDERSTAND FUNDAMENTAL PROPERIES OF SOLAR CELL ABSORBER MTRIAL	57
D.A. Rayan, A.M. Abdelghany, Abdallah Elshourbgy, S.H. Moustafa REMARKABLE IMPACT FOR OPTICAL PROPERTIES OF SAMARIUM DOPED ALUMINUM SODIUM PHOSPHATEGLASS FOR VISIBLE DEVICES	58
A. Alzahrani EFFECT OF SINTERING TEMPERATURE ON CRYSTALLIZATION OF NEPHELINE-LEUCITE GLASS-CERAMICS	59

P. Staciwa, U. Narkiewicz, D. Sibera PREPARATION OF IRON/CARBON COMPOSITES	60
A. Zavjalov, P. Nikiforov, E. Goncharov, D. Kosyanov, K. Talskikh, O. Shichalin, E. Papynov SPARK PLASMA SINTERING OF Hf-C-N CERAMICS	61
M. Kosiorek, A. Żurawska, M. Blesznowski RHEOLOGICAL PROPERTIES OF GLASS-CERAMIC SEALS FOR SOC APPLICATION FABRICATED BY TAPE CASTING	62
Ł. Rakoczy, R. Cygan, M. Grudzień-Rakoczy APPLICATION OF SHELL MOLDS STRENGTHENED BY METAL POWDERS AND GLASS FIBRES IN THE FABRICATION OF JET ENGINE COMPONENTS ..	63
D. Tovar-Vargas, M. Turón-Viñas, M. Anglada, E. Jiménez-Pique PROCESSING, CHARACTERIZATION AND MECHANICAL PROPERTIES OF CERIA CALCIA STABILIZED ZIRCONIA CERAMICS WITH α -ALUMINA ADDITION	64
L. Vásárhelyi, I. Szenti, D. Sebők, Á. Kukovecz, Z. Kónya IN SITU INVESTIGATION OF CRACK PROPAGATION IN CERAMICS BY MICRO-CT TECHNIQUE	64
A. Sedegov, V. Tsybulin, D. Pankratova, A. Taranova, K. Kuskov, S. Vorotylo, D. Moscovskikh, A. Rogachev, A. Mukasyan SELFPROPAGATING HIGH TEMPERATURE SYNTHESIS AND STUDY OF CARBIDE AND DIBORIDE BASED ON REFRACTORY HIGH-ENTROPY ALLOY Hf-Ta-Ti-Nb-Zr	65
A. Qadir, J. Dusza PROCESSING AND PROPERTIES OF SILICON NITRIDE + MWCNTs COMPOSITES PREPARED FROM OXIDIZED α -Si ₃ N ₄ STARTING POWDER	67
V. Nečina, T. Uhlířová, W. Pabst, P. Diblíková THE EFFECT OF HEATING RATE ON THE GRAIN GROWTH OF ALUMINA PREPARED VIA ELECTRIC CURRENT ASSISTED SINTERING (ECAS)	68
T. Boteva, P. Petkov, T. Petkova DIAMOND ELECTRODES FOR ELECTROCHEMICAL APPLICATIONS	68
C. Gorynski, L. Engelke, D.E. Wolf, U. Anselmi-Tamburini, M. Winterer INFLUENCE OF ELECTRIC CURRENT ON MICROSTRUCTURE OF Al DOPED ZnO	69
R. Guillén, L. Gil, M.D. Salvador, A. Borrell, F. Penaranda-Foix, C. González PROPERTIES OF Nb ₂ O ₅ COMPOSITE DOPED WITH ZrO ₂ SINTERED BY MICROWAVE	70
N. Fakrالمobasheri, A. Nourmohammadi EFFECT OF TWO-STEP SINTERING ON MICROSTRUCTURE OF BARIUM TITANATE CERAMICS	71

M. Abedi, D. Moskovskikh¹, A. Mukasyan FABRICATION OF SILICON NITRIDE REINFORCED BY SILICON CARBIDE BY FLASH SPARK PLASMA SINTERING	73
M. Čebela, P. Šenjug, F. Torić, Ž. Skoko, T. Klaser, D. Zagorac, D. Pajić STRUCTURE AND MAGNETIC PROPERTIES OF MULTIFERROIC BiFeO ₃ AND Bi _{1-x} Ho _x FeO ₃	74
D. Szalbot, M. Adamczyk-Habrajska, J.A. Bartkowska, M. Bara, K. Feliksik MAGNETOELECTRIC PROPERTIES OF MULTIFERROIC AURIVILLIUS TYPE Bi ₇ Fe ₃ Ti ₃ O ₂₁ CERAMICS MODIFIED BY STRONTIUM	75
P. Czaja, J. Suchanicz, M. Karolus, M. Adamczyk-Habrajska, D. Bochenek INFLUENCE OF BALL MILLING TIME ON PREPARATION AND DIELECTRIC PROPERTIES OF LEAD FREE K _{0.5} Bi _{0.5} TiO ₃ CERAMICS	76
D. Blaskova-Kochnitcharova, L. Fachikov, T. Petkova, E. Lefterova, D. Vladikova, E. Mladenova, B. Burdin STRUCTURE AND ELECTRICAL PROPERTIES OF TiO ₂ -V ₂ O ₅ -P ₂ O ₅ OXIDES	76
I. Turcan, L. Curecheriu, L. Padurariu, L. Mitoseriu Ag-BaTiO ₃ COMPOSITE CERAMICS WITH MULTIPLE PERCOLATIVE BEHAVIOR	77
A. Nesterovic, J. Vukmirovic, I. Stijepovic, J. Bobic, M. Milanovic, V.V. Srdic PREPARATION AND CHARACTERIZATION OF Bi _{0.5} Na _{0.5} TiO ₃ BASED PIEZOELECTRIC CERAMICS	78
V.A. Lukacs, L.P. Curecheriu, J.L. Jones, L. Mitoseriu SCALE DEPENDENT PHENOMENA IN BaTiO ₃ -BASED CERAMICS	79
J. Dzik, T. Pikula, D. Szalbot, Ł. Ciepły, M. Adamczyk-Habrajska INFLUENCE OF RARE-EARTH IONS ON THE PROPERTIES OF BiFeO ₃ CERAMICS	80
V.K.Veerapandiyan, M. Kratzer, M. Popov, P.B. Groszewicz, J. Spitaler, C. Teichert, G. Canu, V. Buscaglia, M. Deluca ROLE OF POLAR DEFECTS IN THE ORIGIN OF RELAXOR BEHAVIOUR IN NIOBIUM MODIFIED BARIUM TITANATE POLYCRYSTALS	81
D. Brzezińska, R. Skulski, D. Bochenek, P. Niemiec THE PROPERTIES OF (1-x)(0.5PZT-0.5PFW)-xPFN CERAMICS DOPED BY Li....	82
L. Eglite, E. Birks, Maija Antonova, M. Livinsh EFFECT OF SINTERING PARAMETERS AND NON-STOICHIOMETRY ON THE MICROSTRUCTURE OF Na _{0.5} Bi _{0.5} TiO ₃	83
M. Bara, B. Wodecka-Duś, T. Goryczka, M. Adamczyk-Habrajska DIELECTRIC AND ELECTRICAL PROPERTIES OF BLT CERAMICS MODIFIED BY Fe IONS	84
J. Lelièvre, P. Marchet STRUCTURE AND PROPERTIES OF THE LEAD-FREE PERVSKITE COMPOUNDS (Na _{1/2} Bi _{1/2})ZrO ₃ (NBZ) AND (K _{1/2} Bi _{1/2})ZrO ₃ (KBZ)	84

M. Stan, R. Lach, K. Wojciechowski, Ł. Łańcucki, M.M. Bucko SINTERING AND PREPARATION OF POLYCRYSTALS GADOLINIUM-IRON GARNET ($Gd_3Fe_5O_{12}$) BY THE SOLID-STATE REACTION	85
A. Ur Rehman, L. Tingting, M.U. Salamci, F. Pitir, G. Küçüktürk, Z. Kai, L. Wenhe, Z. Changdong ADDITIVE MANUFACTURING OF MAGNESIA AND ALUMINA EUTECTIC COMPOSITES	86
C. Aciksari, S. Pelin Erden, I. Gozde Tuncolu, Umut Savaci, S. Turan, E. Ozel, E. Suvaci SYNTHESIS OF ZINC TIN OXIDE (Zn_2SnO_4) PARTICLES BY VARIOUS METHODS USED AS CERAMIC TARGET FOR SPUTTER TECHNIQUE	87
S. Behara, T. Thomas THEORETICAL INVESTIGATION OF CRYSTAL STRUCTURE PREDICTION USING BOND-VALENCE (BV) MODELLING	88
H. My Bui, O. Hinrichsen CHALLENGES FOR BINDER JETTING OF PACKINGS AND MONOLITHS FOR HETEROGENEOUS CATALYSIS	89
N. Ilić, J. Bobić, M. Vijatović Petrović, A. Džunuzović, V. Veerapandiyan, M. Deluca, B. Stojanović PHOTOCATALYTIC PROPERTIES OF $BiFeO_3$ AND $Bi_5Ti_3FeO_{15}$ BASED POWDERS	90
M. Miklós, T. Korim IMMOBILIZATION OF SIMULATED RADIOISOTOPES IN ALKALI ACTIVATED INORGANIC POLYMERS	90
A. Sápi CATALYSIS REVOLUTION: WITH NANOTECHNOLOGY AND MOLECULAR LEVEL UNDERSTANDING TOWARDS A GREEN FUTURE	91
M. Kocijan, L. Čurković, D. Ljubas, K. Mužina SYNTHESIS, CHARACTERIZATION AND PHOTOCATALYTIC PROPERTIES OF TiO_2 -rGO NANOPARTICLES	92
A. Efremova, A. Sápi, M. Orosz-Ábel Pt NANOPARTICLES – SUPPORTED AND PRISTINE MESOPOROUS METAL OXIDES AS EFFICIENT CATALYSTS FOR CO_2 ACTIVATION	93
M.M. Uzelac, A.G. Šoškić, B.F. Abramović OPTIMIZATION OF THE PHOTOCATALYTIC DEGRADATION OF THIOTRI- AZINONE STABLE HYDROLYSIS PRODUCT OF ANTIBIOTIC CEFTRIAXONE	94
E.-M. Picioruș, C. Ianăși, R. Nicola, M. Ciopec, A. Negrea, A. Len, L. Almásy, A.-M. Putz ADSORPTION STUDIES OF CADMIUM (II) FROM AQUEOUS SOLUTIONS USING INORGANIC POROUS NANOCOMPOSITES	95
A. Boros, T. Korim PHOTOCHEMICAL ACTIVITY OF METAKAOLIN BASED GEOPOLYMER FOAMS	96

A. Kovács, É. Makó PREPARATION OF KAOLINITE-METHANOL AND KAOLINITE- CETYLTRIMETHYLAMMONIUM CHLORIDE COMPLEXES	97
F.V. Simão, H. Chambart, L. Vandemeulebroeke, V. Cappuyns SUSTAINABLE USE OF SULFIDIC TAILING RESIDUES IN THE PRODUCTION OF CERAMIC ROOF TILES	97
A. Skawińska, P. Pichaniarczyk, Ł. Kotwica THE EFFECT OF LIGHTWEIGHT AGGREGATES FROM SEWAGE SLUDGE ON TOBERMORITE FORMATION IN CaO-SiO ₂ -H ₂ O SYSTEM UNDER HYDROTHERMAL CONDITIONS	98
L.J. Jaramillo Nieves, F. Elyseu, E. Zabot, M. Souza, L. Zilli, M. Damazio, S. Martins, G.C. Bellettini, S. Goulart, A.M. Bernardin SYNTHESIS OF COAL ASH BASED GEOPOLYMERS: INFLUENCE OF NaOH CONCENTRATION AND SOLID FRACTION	99
J. Ramult, K. Tyrała, R. Prorok, D. Madej THE EFFECT OF TEMPERATURE ON THE PROPERTIES OF NON-CEMENT ALUMINA-SPINEL CASTABLE	100
J. Rakić, Z. Baščarević, R. Petrović, S. Kovač POSSIBILITY TO USE SPENT FLUID CATALYTIC CRACKING CATALYST AS COMPONENT OF PORTLAND CEMENT BINDERS	101
R. Kusiorowski EFFECT OF TITANIUM OXIDE ADDITION INTO MAGNESIA REFRACTORIES ..	101
H. Ünsal, I. Shepa, O. Hanzel, E. Múdra, J. Dusza, P. Tatarko THE EFFECT OF FIELD ASSISTED SINTERING PARAMETERS ON PROCESSING OF IN-SITU FORMED B ₄ C-TiB ₂ CERAMICS	102
G. Can Tatlısu, C. Aciksari, Y. Teke, C. Karakaya, O. Akarcay, E. Keles, S. Celebi, S. Turan FABRICATION OF POWDER BASED CERAMIC INSULATION MATERIAL FOR HIGH TEMPERATURE APPLICATIONS	103
N. Gilli, A. Migliori, J. Watts, W.G. Fahrenholtz, G.E. Hilmas, L. Silvestroni EFFECT OF ANNEALING ON THE STRENGTH RETENTION AT ULTRA-HIGH TEMPERATURE	104
A. Martiz, A.M. Keszler DEVELOPMENT OF ZrC-BASED CERAMIC NANOCOMPOSITES	105
J. Zou, M. Porter, X.-Y. Lu, Y.-L. Chiu, J. Binner CHARACTERIZATION OF SiC _f /SiC COMPOSITES DENSIFIED BY MICROWAVE ASSISTED CHEMICAL VAPOUR INFILTRATION	105
Ö. Ulaş Kudu, T. Famprikis, E. Suard, M.-D. Braidă, T.L. Mercier, B. Fleutot, C. Masquelier INORGANIC Li-ION CONDUCTORS FOR ALL SOLID STATE BATERIES: CRYSTAL CHEMISTRY AND TRANSPORT PROPERTIES IN THE Li ₂ S-P ₂ S ₅ SYSTEM	106

I. Podunavac, M. Radović, J. Vidić, G. Kitić, V. Radonić ULTRA-SENSITIVE ELECTROCHEMICAL BIOSENSOR REALIZED USING LTCC TECHNOLOGY	108
A. Robles, A. Orera, R.I. Merino, P.R. Slater SUITABILITY OF Sr AND Co-FREE LANTHANUM PEROVSKITE MATERIALS AS CATHODES FOR IT-SOFC WITH A LANTHANUM SILICATE APATITE-TYPE ELECTRODE	109
A.G. Glukharev, O.Y. Kurapova, V.G. Konakov THE DEVELOPMENT OF THE NOVEL TERNARY Y ₂ O ₃ -CeO ₂ -ZrO ₂ AND TiO ₂ - CeO ₂ -ZrO ₂ SOLID ELECTROLYTES VIA CRYOCHEMICAL ROUTE	110
L. Ajdys, A. Żurawska, Y. Naumovich PARTICLE SIZE INFLUENCE ON THE FORMING OF THIN SPINEL LAYERS ON A STEEL SUBSTRATE FOR SOFC APPLICATION	111
I. Polishko, Y. Brodnikovskiy, N. McDonald, D. Brodnikovskiy, I. Brodni- kowska, M. Brychevskiy, N. Lysunenko, L. Kovalenko, O. Vasylyev, A. Belous, R. Steinberger-Wilckens PROPERTIES OF ADVANCED YTTRIA- AND SCANDIA-STABILIZED ZIRCONIA COMPOSITE FOR SOLID OXIDE FUEL CELL APPLICATION	112
A. Novokhatska, G. Akimov, L. Kovalenko THE STUDY OF CERAMIC COMPOSITES BASED ON ZIRCONIA AND MANGANITE WITH EXCESS MANGANESE FOR CATHODE OF SOFCs	113
F. Elyseu, L.J. Jaramillo Nieves, B. Nascimento de Souza, A.M. Bernardin, A.G. Dal Bó ELECTRICAL PROPERTIES OF SiO ₂ -Na ₂ O-LiO ₂ -Bi ₂ O ₃ CONDUCTIVE GLASSES	114
A. Ressler, M. Antunović, M. Cvetnić, I. Marijanović, M. Ivanković, H. Ivanković BIOMIMETIC ZINC AND MAGNESIUM SUBSTITUTED CALCIUM PHOSPHATES DERIVED FROM BIOGENIC SOURCE	115
M. Rashwan, N. Karpukhina, R.G. Hill THE EFFECT OF THE PARTICLE SIZE ON SYNTHESIS AND CRYSTALLIZA- TION OF POTASSIUM FLUORMICA GLASS-CERAMICS	116
T. Matic, M. Ležaja Zebić, Miletić, R. Petrović, Đ. Janačković, Đ. Veljović THE COMPARISON OF THE BONDING ABILITY OF DENTAL INSERTS BASED ON STRONTIUM AND MAGNESIUM DOPED HYDROXYAPATITE WITH RESTORATIVE MATERIALS	117
C. Ianasi, A.-M. Putz EVALUATION OF THE MORPHO-TEXTURAL AND MAGNETIC PARAMETERS OF THE SiO ₂ -Fe ₂ O ₃ SYSTEM	118
M. Mladenović, N. Ilić, G. Kaluderović, N. Knežević pH-RESPONSIVE DELIVERY OF ANTICANCER METAL COMPLEXES BY FUNCTIONALIZED MESOPOROUS SILICA-BASED NANOCARRIERS	119

V.S. Buinevich, A.A. Nepapushev, G.V. Trusov, D.O. Moskovskikh, A.S. Rogachev, A.S. Mukasyan SELF-PROPAGATING HIGH-TEMPERATURE SYNTHESIS AND MECHANOCHEMICAL SYNTHESIS OF ULTRA-HIGH TEMPERATURE Hf-C-N CERAMICS FOR EXPLOITATION IN EXTREME CONDITIONS	120
D. Kozić, M.M. Bućko SINTERING OF BORON-RICH CARBIDE POWDERS	121
V.K. Manisa, T. Williams, L. Naicker, M. J. Whiting, R.A. Dorey TAILORING A NEAR ZERO TEMPERATURE COEFFICIENT OF RESISTANCE IN PRESSURELESS SINTERED MWCNT/Al ₂ O ₃ AND GPO/Al ₂ O ₃ COMPOSITES ..	122
V. Pavkov, G. Bakić, V. Maksimović, M. Mirković, J. Luković¹, A. Maslarević, B. Matović SYNTHESIS AND CHARACTERIZATION OF METAL-GLASS COMPOSITE MATERIAL	122
Y. Tabak, A. Kılıç, Ş. Polat, B.K. Vatansever, H. Ünsal PRODUCTION OF Si ₃ N ₄ CERAMIC TAPES BY TAPE CASTING METHOD FOR ARTIFICIAL BONE APPLICATION	123
P. Piotrkiewicz, J. Zygmuntowicz, A. Miazga, M. Wachowski, W. Kaszuwara THE Al ₂ O ₃ -Cu-Cr COMPOSITES – MICROSTRUCTURE AND SELECTED PROPERTIES	124
S. Bakan, H. Boussebha, B. Özdemir, A.O. Kurt SYNTHESIS OF B ₄ C POWDER VIA DYNAMIC THERMOCHEMICAL METHOD	125
T. Lomakina, O. Kurapova, V. Konakov HYDROLYSIS PROCESSES AND PHASE EQUILIBRIA IN ZrO ₂ AND 4Y ₂ O ₃ - 96ZrO ₂ PRECURSORS (mol%), OBTAINED BY REVERSE CO-PRECIPIATION	126
M.M. Ismail, D.A. Rayan STRUCTURE, MAGNETIC PROPERTIES AND INDUCTION HEATING ABILITY STUDIES FOR HYPERTHERMIA TREATMENT OF TUMORS BY Mn SUBSTITUTED CuFe ₂ O ₄ NANOPARTICLES	127
S. Laketić, M. Rakin, M. Momčilović, J. Ciganović, Đ. Veljović, I. Cvijović-Alagić LASER SURFACE MODIFICATION OF CP-Ti IN DIFFERENT GAS ATMOSPHERES	128
A. Pahomi, V. Chiriac, G. Vlase, T. Vlase, P. Albu, G. Iliu STRUCTURAL AND THERMIC INVESTIGATION ON A NOVEL METHOD OF SYNTHESIS FOR HYDROXYAPATITE	129
M. Mirković, M. Stojmenović, S. Erić, A. Rosić, S. Nenadović, L. Kljajević, B. Matović SYNTHESIS, STRUCTURE AND THE POSSIBILITY OF USING DIFFERENT MATERIALS FROM THE CALCIUM PHOSPHATE GROUP	130

M. Pantović Pavlović, M. Pavlović, S. Eraković, T. Barudžija, J. Stevanović, N. Ignjatović, V. Panić <i>IN SITU</i> SYNTHESIS AND CHARACTERIZATION OF HYDROXYAPATITE/ TITANIUM OXIDE COATINGS DERIVED BY ANODIZATION AND ANAPHORETIC DEPOSITION	131
J. Vujančević, A. Bjelajac, G. Provas, Z. Siketić, M. Jakšić, V. Pavlović, Đ. Janačković ToF-ERDA/RBS ANALYSIS OF ANNEALED TiO ₂ NANOTUBES GROWN ONTO FTO GLASS	132
Z.Z. Vasiljevic, M. Dojcinovic, I. Jankovic-Castvan, J. Vujancevic, N. Tadic, M.V. Nikolic STRUCTURE AND PHOTOCATALYTIC PROPERTIES OF SOL-GEL SYNTHESIZED PSEUDOBROOKITE	133
C. Belkessam, M. Mechouet, J. Ghilane, N. Djelali, N. Idiri PRECURSORS EFFECT ON Ni _{0.3} Co _{2.7} O ₄ OXIDE ELECTROCATALYTIC ACTIVITY	133
P. Szoldra, W. Pichór TiO ₂ -BASED PHOTOCATALYTIC COATING FOR CERAMIC MATERILAS	134
P. Svera, C. Ianasi STUDY ON THE PHOTOCATALYTIC BEHAVIOR OF Zn BASED SEMICONDUCTOR IN THE PRESENCE OF ORGANIC STABILIZATOR AND CO-CATALYST ..	135
M. Dojcinovic, Z. Z. Vasiljevic, J. Vujancevic, V.P. Pavlovic, S. Markovic, N.B. Tadic, M.V. Nikolic VISIBLE LIGHT PHOTOCATALYTIC ACTIVITY OF NANOCRYSTALLINE Co _x Mg _{1-x} Fe ₂ O ₄ (x = 0-1)	136
S. Iliés, C. Ianasi, F. Manea, A.Baciu, C. Delcioiu HUMIC ACID REMOVAL FROM WATER USING A-Fe ₂ O ₃ NANOMATERIAL BY SORPTION AND PHOTOCATALYTIC UNDER VIS IRRADIATION	136
A. Džunuzović, M. Vijatović Petrović, J. Bobić, N. Ilić, B. Stojanović INFLUENCE OF FERRITES PHASE ON PROPERTIES OF THE BARIUM ZIRCONIUM TITANATE BASED MULTIFERROIC COMPOSITES	137
S.R. Balauca, L. Padurariu, L. Mitoseriu FINITE DIFFERENCE METHOD FOR MODELLING THE DIELECTRIC PROPERTIES OF CERAMIC COMPOSITES	138
P. Zachariasz, P. Pęczkowski, P. Konieczny, K. Kluczevska-Chmielarz, P. Czaja, D. Bochenek, S. Baran MAGNETIC AND FERROELECTRIC PROPERTIES OF SCTO-(C,M)FO MULTIFERROICS	139

P. Pęczkowski, P. Zachariasz, C. Jastrzębski, B.C. Camargo, J. Szczytko, M. Muzyk CHARACTERIZATION OF SUPERCONDUCTOR (YBa ₂ Cu ₃ O _{7-δ}) – MULTI-FERROIC (YMnO ₃) HETEROSTRUCTURES	140
M. Jahanara Mohammad, H. Ramachandran, P. Swaminathan ELECTRICAL CHARACTERIZATION OF METAL OXIDE COMPOSITES PREPARED THROUGH PHYSICAL AND CHEMICAL ROUTES	141
M. Parfenova, V. Lutsyk CERAMICS MICROSTRUCTURE SIMULATION ON THE ISOTHERMAL SECTIONS OF T-x-y DIAGRAM BY MEANS OF EXCEL SHEETS AND AutoCAD SOFTWARE	142
D. Kostić, D. Balaban, M. Perušić, B. Pejović PROCESS PARAMETERS OPTIMIZATION OF ALUMINIUM-TRIHIDRATE SYNTHESIS	143
K. Kaczmarczyk, J. Michalek, K. Pasiut, J. Partyka EFFECT OF ZrSiO ₄ ADDITION ON SITERING OF GLASS-CERAMIC MATERIALS FROM THE SiO ₂ -Al ₂ O ₃ -Na ₂ O-K ₂ O-CaO-MgO-BaO SYSTEM	144
A. Duša, I. Podunavac, S. Kojić, V. Radonić MICROFLUIDIC SENSORS REALIZED USING LOW-TEMPERATURE CO-FIRED CERAMIC TECHNOLOGY	144
C. Belkessam, M. Mechouet, J. Ghilane, N. Djelali, N. Idiri Ni _{0.3} Co _{2.7} O ₄ SPINEL OXIDE IMMOBILIZED IN TEFLON CAVITY ELECTRODE FOR ENVIRONMENTAL APPLICATIONS	145
J. Michalek, K. Kaczmarczyk, K. Pasiut, J. Partyka PRIMARY RESEARCH ON PORCELAIN WASTE UTILISATION	146
Đ. Kerkez, D. Radenović, D. Tomašević Pilipović, N. Slijepčević, M. Bečelić-Tomin, D. Krčmar, B. Dalmacija MICROSTRUCTURAL CHARACTERIZATION OF SOLIDIFIED/STABILIZED MATRICES OF POLLUTED SEDIMENT AND CLAY IN LONG-TERM TREATMENT	146
K. Rajczyk, A. Kaliciak, G. Janus, D. Brukhanska CEMENTLESS CONCRETE COMPOSITE FROM KAOLINITE AND ALUMINO-SILICATE WASTE MATERIALS	147
T. Labbilta, M.A. Harech STUDY OF THE EFFECT OF CALCIUM SUBSTITUTION BY MAGNESIUM IN A GLASS-CERAMIC FERTILIZER	148
J. Gonciarzyk, K. Stec, A. Bobrowski, A. Królicka APPLICATION OF ICP AES METHOD AND MICROWAVE DIGESTION TO ROUTINE ANALYSIS OF CORUNDUM MATERIALS	149
Y.V.Yurchenko O.A. Korniienko, O.I. Bykov, A.V. Sameljuk, E.R. Andrievskaya PHASE RELATIONS AND ADVANCED MATERIALS IN THE ZrO ₂ -La ₂ O ₃ -Gd ₂ O ₃ SYSTEM	150

which should meet the increasingly stringent water quality standards. In this paper, the synthesis, characterization and testing performance of α -Fe₂O₃ nanomaterial for humic acid (HA) sorption and photocatalysis experiments has been presented. The Fe(acac)₃/silica/PVA nanocomposite was synthesized via sol-gel method at room temperature. The reactant molar ratio between reactants used for the synthesis was: TEOS : H₂O : PVA : Fe(acac)₃ : MeOH : HNO₃ = 1 : 10 : 1.2·10⁻⁵ : 0.20 : 18 : 0.01 was used. The synthesized material was characterized by X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR) spectra and transmission electron microscopy (TEM). Textural properties of nanocomposite were analysed using nitrogen sorption/desorption measurements at liquid nitrogen temperature (77K). The morphology of iron oxide nanoparticles was examined by scanning electron microscopy (SEM). The photocatalytic experiments were conducted in a photocatalytic reactor under visible irradiation (VIS light set between 460 and 510 nm). The sorption experiments were carried out under similar conditions of photocatalysis without irradiation. Pseudo-first- and pseudo-second-order kinetic models were tested for fitting the sorption and photocatalysis experimental data. The pseudo-second-order kinetic model fit very well the experimental data for the humic acid (HA) sorption and photocatalysis. The calculated q_e values agree very well with the experimental data, and the correlation coefficients for the pseudo-second-order kinetic model are higher than 0.90. It can be concluded that the photocatalytic effect of α -Fe₂O₃ is manifested in special from kinetics point of view and higher dose led to better sorption performance. The results of this study recommend α -Fe₂O₃ as potential material for the design of advanced process to remove HA from water.

OC-117

INFLUENCE OF FERRITES PHASE ON PROPERTIES OF THE BARIUM ZIRCONIUM TITANATE BASED MULTIFERROIC COMPOSITES

Adis Džunuzović, Mirjana Vijatović Petrović, Jelena Bobić, Nikola Ilić,
Biljana Stojanović

*Institute for Multidisciplinary Research, Belgrade University, Kneza Višeslava 1,
Belgrade, Serbia
e-mail: a.dzunuz@hotmail.com*

Multiferroic composites with general formula Ba(Ti_{0.95}Zr_{0.05})O₃-Ni_{0.7}Zn_{0.3}Fe₂O₄/CoFe₂O₄/Ni_{0.7}Cu_{0.01}Sm_{0.05}Zn_{0.29}Fe_{1.95}O₄, (BTZr(95-5)-NZF/CF/NCuSmZF) were prepared by mixing chemically obtained different types of ferrites and BTZ(95-5) powders in the planetary mill for 24 h. The optimization of sintering process was performed and powders were pressed and sintered at 1300 °C for obtained composites samples. From X-ray analysis for single phase and composites ceramics can be noticed the formation of crystallized structure of ferrites and barium zirconium titanate. SEM

analyses indicated the formation of two types nanosized grains, polygonal ferromagnetic and rounded ferroelectric grains.

The electrical properties of these materials were investigated using impedance spectroscopy and analysis of ferroelectric measurements. Impedance analysis of all investigated samples has shown different relaxation processes that originated from the grain and grain boundary contributions. The results of polarization vs. electric field measurements have shown the influence of magnetic phase type and its concentration on the ferroelectric properties of the composites. Due to high conductivity of ferrite phases and presence of interfacial polarization, the shapes of these curves differed from the conventional ferroelectric materials.

OC-118

FINITE DIFFERENCE METHOD FOR MODELLING THE DIELECTRIC PROPERTIES OF CERAMIC COMPOSITES

Stefan Razvan Balauca, Leontin Padurariu, Liliana Mitoseriu

Dielectrics, Ferroelectrics & Multiferroics Group, Faculty of Physics, Al. I. Cuza University, Blv. Carol I, no.11, 700506, Iasi, Romania

e-mail: stefy_razvan2000@yahoo.com

Composite electroceramics (*e.g.* magnetoelectrics, porous materials, core-shell structures) contain at least two distinct phases with different chemical and physical properties, separated by well-defined interfaces. These interfaces usually collect uncompensated free or bounded charges, due to the fact that the constituent phases have contrasting permittivity and conductivity. Therefore, their effective dielectric properties are not simple *sum properties* derived from ones of the parent phases, but they contain important contributions from the interfaces. To describe the overall electrical response of such inhomogeneous systems, one should consider that interfaces between di-similar materials introduce local field inhomogeneities, which are specific to a microstructure. While the simple effective field theories provide information about the static permittivity, the numerical approaches allow to compute effective dynamic complex permittivity for realistic microstructures.

In the present work, we propose the Finite Difference Method to solve the Poisson equation to compute local electric field, charge distribution at different variable voltages and to extract the time-dependent $I(V)$ and impedance response of ferroelectric-magnetic composite ceramics with different types of compositions and phase interconnectivity. By considering thermally activated mechanisms for conduction (Arrhenius) in the calculation of local charge distributions (in the continuity equation), the frequency and temperature response were simulated and compared with experimental ones for composites based on ferroelectrics (BaTiO_3 , $\text{Pb}(\text{Zr,Ti})\text{O}_3$) and ferrites (CoFe_2O_4 , NiFe_2O_4) [1,2]. The model describes the role of different parameters as filling factor, permittivity and conductivity values of the parent phases, frequency and temperature, as