11TH CONFERENCE
FOR YOUNG SCIENTISTS IN CERAMICS

Satellite event:
ESR COST IC1208 Workshop

BOOK OF ABSTRACTS

October 21-24, 2105
Faculty of Technology
Novi Sad, Serbia

11th CONFERENCE for YOUNG SCIENTISTS in CERAMICS

Satellite event:

ESR Workshop, COST IC1208

PROGRAMME
and
BOOK OF ABSTRACTS

October 21-24, 2015

Novi Sad, Serbia

Programme and Book of Abstracts of The 11th Conference for Young Scientists in Ceramics (SM-2015, and ESR Workshop, COST MP1208) publishes abstracts from the field of ceramics, which are presented at traditional international Conference for Young Scientists in Ceramics.

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Preface

The 11th Conference for Young Scientists in Ceramics is organized by the Department of Materials Engineering, Faculty of Technology Novi Sad, University of Novi Sad, Serbia (October 21-24, 2015) and it is followed with one Satellite Event: Early Stage Researchers Workshop of the COST Action IC1208 "Integrating devices and materials: a challenge for new instrumentation in ICT".

This Conference first started as the Students' Meeting back in 1998 when it was just a national meeting for Serbian PhD students. After three national, this year is going to be the eighth consecutive international conference held every second year. For several years now, the Conference has a well-earned reputation as an excellent opportunity for the promotion of the work in the field of ceramics done by early stage researchers, being MSc and PhD students or young doctors. Additionally, the young scientists will be in the position to attend sessions covering major general topics of broad interest which will be presented by experienced scientists through the invited lectures. In that way, young researchers will have a chance to participate in the active discussions with their senior colleagues who are all well-known scientists in their area of expertise. We strongly hope that the overall activities during this event will create for the young researchers a fruitful platform for finding new topics, ideas and approaches for their scientific research and an excellent opportunity for establishing connections and finding proposals for collaborations

General idea behind the Conference was and will continue to be the building of the closely intertwined European scientific network by offering the platform for young scientists to meet, discuss and exchange ideas in the ever growing field of ceramics. It is our deepest belief that this approach will be beneficial for both young researchers and the European science as a whole. Therefore, we strongly appreciate that the European Ceramic Society identified the efforts and the enthusiasm we have put into this idea of creating the bridge between young researchers and we truly hope that the European Ceramic Society will support this initiative in the future. Special thanks to the JECS Trust Fund and COST IC1208 for strong financial support of the Meeting. The Conference was also recognized by the Serbian Ministry of education, science and technological development as well as by the Provincial Secretary of science and technological development and we would like to thank them for their endorsement too. A total number of 110 presentations given by young researchers and 13 invited talks coming from 25 countries with multidisciplinary profiles will be presented during the conference. It should be emphasised that presented topics cover research subjects of the highest scientific interest: experimental, theoretical and applicative aspects of synthesis, processing, advanced nano/microscale and functional characterisation of various types of structures and ceramic materials. We wish to express our thanks to the members of the local organizing committee in Novi Sad for their effort and time during preparation of the Conference, and especially to thank our endorsers and sponsors for making this event possible.

Editors

LIST OF SPONSORS

The European Ceramic Society

The JECS Trust Fund

COST IC1208

Ministry of Education and Science, Republic of Serbia

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Tourist organization of Novi Sad

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HYDROTHERMAL SYNTHESIS OF COMPOSITE HETEROSTRUCTURES IN THE TiO_2-SnO_2 SYSTEM

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Among the metal oxides, tin oxide and titanium dioxide belong to the group of materials with potentially the widest range of applications, due to their chemical and electrical properties. There are many studies relating to the synthesis and individual properties of TiO_2 and SnO_2. However, the hydrothermal synthesis and characteristics of composite nanoparticles in the TiO_2-SnO_2 system have not been much investigated. The work presents the synthesis and characterization of TiO_2-SnO_2 heterostructures obtained by the alkaline hydrothermal method. Applied experimental procedure allows to obtain mixtures of TiO_2 and SnO_2 crystals differs in size and shape.

The materials were characterized by X-ray diffraction (XRD), surface area estimated from the N_2 physisorption isotherm (BET), high-resolution transmission electron microscopy (HRTEM), scanning transmission electron microscopy (STEM).

X-ray diffraction measurements performed for nanocomposites TiO_2-SnO_2 reveal that nanomaterials are well crystallized and two polymorphic forms, anatase TiO_2 and cassiterite SnO_2 are presented. The obtained nanopowders are characterized by a significantly expanded specific surface area, which suggests low agglomeration of particles. The particle size of the composite nanoparticles was in the range of 5 nm (cassiterite) to 40 nm (anatase).

Acknowledgement: The project was financed from the National Science Centre (NCN) based on the decision number DEC-2012/07/B/ST8/03879.

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SOLVOTHERMAL SYNTHESIS OF MAGNETITE NANOPARTICLES SUITABLE FOR APPLICATION IN MAGNETIC HYPERTHERMIA

V. Nikolić, A. Mraković, M. Perović, M. Bošković, V. Spasojević, V. Kusigerski, J. Blanuša

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In this paper, spherical Fe_3O_4@OA nanoparticles were prepared via solvothermal method, in which iron sulphate, sodium hydroxide and oleic acid were used as

precursors. The main idea of this research was to develop the method for preparation of nanoparticles with magnetic properties suitable for application in magnetic hyperthermia. We have tried to tailor size, shape and the degree of interparticle interactions by varying experimental conditions during the synthesis route. Obtained samples were structurally and magnetically characterized by means of different experimental probes such as: X-ray diffraction, SQUID magnetometry, FTIR and Mossbauer spectroscopy. Structural characterization asserts that the obtained phase is magnetite, Fe_3O_4, while FTIR spectra support the presence of oleic acid coating on the particle surface. Detailed magnetic characterization done by SQUID measurements and Mossbauer spectroscopy confirmed the presence of the strong and weak interactions in the nanoparticles system, depending on the synthesis conditions.

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SPHERICAL SILICA NANOPARTICLES OBTAINED BY STÖBER PROCESS – TETRA-ETHYL-ORTHOSILICATE CONCENTRATION INFLUENCE UPON SILICA NANOPARTICLES MORPHOLOGY

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Spherical silica nanoparticles with controllable sizes was synthesized using tetra-ethyl-orthosilicate as starting material and ethanol as mutual solvent by base catalyzed sol-gel method. The influence of the precursor's concentration on the characteristics of the silica powders was investigated. Reactants mole ratio was nTEOS:H_2O:ETOH:NH_3 where n = 0.022÷0.31 : 0.43 : 0.789 : 0.06. Powders have spherical morphology, and diameter between 3 and 9 nm. Synthesized silica particles were characterized using SEM (Scanning Electron Microscopy). Textural properties of silica particles were investigated by BET technique. Results of BET specific surface area analysis were in 13–112 m^2/g range. The sol-gel route possesses advantage for synthesis of silica from silicon alkoxides, because of its low cost and environment friendly.

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