Faculty of Technology
University of Novi Sad

9th Students' Meeting
and
2nd ESR COST MP0904 Workshop

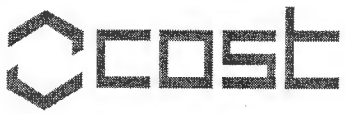
Book of Abstracts

SM 2011
COST SIMUFER

Novi Sad, Serbia, November 16-18, 2011

CONFERENCE for YOUNG SCIENTISTS

The Ninth Students' Meeting, SM-2011
The Second ESR Workshop, COST MP0904



PROGRAMME
and
BOOK OF ABSTRACTS

November 16-18, 2011
Novi Sad, Serbia

Programme and Book of Abstracts of the Conference for Young Scientists (The Ninth Students' Meeting - SM-2011, and The Second ESR Workshop, COST MP0904) publishes abstracts from the field of ceramics, which are presented at traditional international the Conference for Young Scientists.

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Preface

The Conference for Young Scientists is organized by the Department of Materials Engineering, Faculty of Technology, University of Novi Sad, Serbia (November 16-18, 2011). This year it consists of two events The Ninth Students' Meeting, SM-2011, "Processing and Application of Ceramics" and The Second Early Stage Researchers Workshop of the COST Action MP0904 "Single- and multiphase ferroics and multiferroics with restricted geometries".

The Students' Meeting started first as a national meeting in 1998, but with patient work and strong effort we succeeded to raise the quality up to the standards of today's International Meeting. The main goals of this traditional Meeting are the promotion of the work in the field of ceramics done by early stage researchers, being MSc and PhD students or young doctors. Additionally, major general topics of broad interest will be presented by experienced scientists through the invited lectures and active discussions are expected in the specific domains of the oral presentations. 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.

It is our deepest belief that by gathering the young human resources in Europe trough such events, an active European scientific network can be created, for the general benefit of R&D in Europe. Therefore, we strongly appreciate that the European Ceramic Society recognized the efforts and the enthusiasm we have put into this idea of building 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 MP0904 for strong financial support of the Meeting.

A total number of 112 presentations given by young researchers and 11 invited talks coming from 27 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 Meeting, and especially to thank our endorsers and sponsors for making this event possible.

On behalf of the organising committee, a warm welcome to all participants of our Conference and hope you will have a successful Meeting with many interesting discussions. Have a good and fruitful time in Novi Sad!

Editors

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decomposition. For known chemical composition of broken glass the temperature dependence of viscosity were calculated by Okhotin's method. For known range of viscosity the composition of foaming agent was selected. It temperature range of active decomposition corresponded to the calculated value of the viscosity of glass at the present temperature.

In addition, total porosity, open porosity and compressive strength were tested. It was established the possibility preparation of high porous glassceramic material based on broken glass and magnomass with open porosity up to 67%, compressive strength up to 10 MPa.

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POROUS MULLITE CERAMICS FORMATION AND MODIFICATION WITH SOME ADDITIVES

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Keywords: mullite, kaolin, alumina, silica, porosity, refractory ceramics

Development of modern technologies requires the production of materials with perfect and sometimes universal properties. Favorable refractoriness at temperature above 1580°C can be achieved when raw materials such as kaolin, alumina and silica were mixed and sintered about at 1700°C temperature, when mullite phase was formed as result of sintering. Mullite ceramics display excellent resistance to chemical corrosion [1,2]. Therefore mullite ceramics have been widely used as constructional materials and also its high porosity ceramics serve as a heat insulator in the thermal protection systems.

The aim of this work was to investigate the influence of different ratio of kaolin, silica and alumina with different grain size as raw materials on mullite formation and its quantity in our ceramic materials. The method of preparation and sintering temperature as well as additives influence on such properties of mullite ceramics as the bending strength, thermal shock resistance, coefficient of thermal expansion, load resistance at high temperatures, the volume and shape stability at the high temperatures [1,2].

The porous mullite materials were prepared by slip casting of suspension of raw materials where the aluminium paste (0.18 wt.%) was used as a pore former. Pore formation occurred as a result of hydrogen formation in a chemical reaction between aluminium paste and raw materials, when water suspension is with pH > 7, because it is prerequisite condition for gas elimination reaction ability of metallic aluminium. This method was used, because it is more ecological than the method of additive of combustible matter [1,2].

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APPLICATION OF VARIOUS PORE-FORMERS FOR CERAMIC MATERIALS

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Porous ceramics are a subject of intensive research for their wide applications for instance as catalyst carrier, ceramic filter, sensor, porous electrode, biomaterials, thermal barrier, and so on [1,2]. There is a long list of various methods use to fabricate ceramics with porous structure include, among others, pore-foaming technique, infiltration of ceramic sol into template structures, gel-casting, starch consolidation, microwave processing, electrophoretic deposition, freeze casting [3–6].

Porous ceramic is defined as an inorganic material obtained by heat treatment, whose characteristic feature is porosity. Porosity is a measure of void spaces in material and it is a fraction of the volume of voids over the total volume of the specimen. Such porous materials have less mechanical strength than solid ones. In most cases void spaces are obtained by removal of the filling agent so it is important that the base material has created stable structure, which preserve appropriate relationship between porosity and mechanical properties.

Therefore a several ceramic pellets were fabricated using various pore-formers. Density and porosity of pellets was measured by Archimedes method and the properties of microstructure were determined by scanning electron microscope. As an example ceramic material strontium titanate was used.

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