

**NINTH YOUNG RESEARCHERS CONFERENCE
MATERIALS SCIENCES AND ENGINEERING**

**December 20-22, 2010, Belgrade, Serbia
Serbian Academy of Sciences and Arts, Knez Mihailova 35**

Program and the Book of Abstracts

**Materials Research Society of Serbia
and
Institute of Technical Sciences of the
Serbian Academy of Sciences and Arts**

December 2010, Belgrade, Serbia

Book title:

**Ninth Young Researchers Conference - Materials Sciences and Engineering:
Program and the Book of Abstracts**

Publisher:

**Institute of Technical Sciences of the Serbian Academy of Sciences and Arts
Knez Mihailova 35/IV, 11000 Belgrade, Serbia**

Tel: +381-11-2636994, fax: 2185263

<http://www.itn.sanu.ac.rs>

Editor:

Prof. Dr. Nenad Ignjatović

Technical Editor:

Aleksandra Stojičić

Printer:

Copy Planet

Brankova 12, 11000 Belgrade, Serbia

Tel: +381-11-3036545, fax: 3036546

<http://www.copyplanet.rs>

Edition:

130 copies

CIP – Каталогизacija у публикацији
Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers Conference Materials Sciences and Engineering (9 ; 2010 ; Beograd)

Program ; #and the #Book of Abstracts / Ninth Young Researchers Conference Materials Sciences and Engineering, December 20–22, 2010, Belgrade, Serbia ; [organized by] Materials Research Society of Serbia and Institute of Technical Sciences of the Serbian Academy of Sciences and Arts ; [editor Nenad Ignjatović]. – Belgrade : Institute of Technical Sciences of SASA, 2010 (Belgrade : Copy Planet). – XIV, 50 str. ; 30 cm

Tiraž 130. – Registar.

ISBN 978–86–80321–26–4 (ITNSANU)

1. Materials Research Society (Beograd) 2. Institute of Technical Sciences of SASA (Beograd)

a) Наука о материјалима - Апстрактни b) Технички материјали – Апстрактни

COBISS.SR-ID 180427276

II/1

Synthesis and dielectric properties of calcium copper titanate (CCTO) based ceramics

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The perovskite $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ (CCTO) powders with various oxide phase impurities were synthesized via citric gel combustion method. Influence of citric acid amount used for gel preparation was examined in order to lower CCTO formation temperature to obtain powders with less impurities and better micro structural characteristics. Prepared powders were pressed into pellets and sintered at 1000 °C. Effects of oxide component impurities, such as CuO, rutile, anatase, CaTiO_3 were examined on sintering behavior and dielectric properties of ceramics. Phase composition of powders and sintered specimens were determined by XRD, microstructure powders and sintered bodies were observed by SEM, and dielectric constants of sintered ceramics were measured by Wayne-Kerr B224 universal bridge.

II/2

Synthesis, stability ranges, structural characteristics and electrical conductivity of BI(CR,FE)VOX solid solutions.

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Samples of Cr^{III} , Fe^{III} -substituted bismuth vanadate, formulated as $\text{Bi}_4\text{V}_{2-x}\text{Fe}_{x/2}\text{Cr}_{x/2}\text{O}_{11-\delta}$, $0 < x < 0.70$, were synthesized by convenient solid-state and citrate-nitrate methods. The structure was investigated using X-ray powder diffraction, differential thermal analysis and high-temperature X-ray powder diffraction. The solid solutions with $0.2 \leq x \leq 0.7$ crystallize in tetragonal space group $I4/mmm$. Electrical conductivity of BICRFEVOX was studied by means of impedance spectroscopy as a function of temperature and composition. Above 873 K the highest conductivity is characteristic for $x=0.2$ solid solution. Samples synthesized via liquid precursors display higher total conductivity than those obtained by solid-state technique.