

FOURTEENTH ANNUAL CONFERENCE

YUCOMAT 2012

Hunguest Hotel Sun Resort Herceg Novi, Montenegro,
September 3–7, 2012
<http://www.mrs-serbia.org.rs>

Programme and The Book of Abstracts

Organised by:
Materials Research Society of Serbia

under the auspices of
Federation of European Material Societies
and
Materials Research Society

Title: THE FOURTEENTH ANNUAL CONFERENCE
YUCOMAT 2012
Programme and the Book of Abstracts

Publisher: Materials Research Society of Serbia
Knez Mihailova 35/IV, 11000 Belgrade, Serbia
Phone: +381 11 2185-437; Fax: + 381 11 2185-263
<http://www.mrs-serbia.org.rs>

Editor: Prof. Dr. Dragan P. Uskoković

Technical editor: Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić

Copyright © 2012 Materials Research Society of Serbia

Acknowledgment:



**Materials
Research
Society**



Printed in: Biro Konto
Sutorina bb, Igalo – Herceg Novi, Montenegro
Phones: +382-31-670123, 670025, E-mail: bkonto@t-com.me
Circulation: 200 copies. The end of printing: August 2012

P.S.B.3.

SINTERING OF OXIDE POWDER SYSTEMS PRODUCED BY CHEMICAL PRECIPITATION AND PLASMA SPRAY SYNTHESIS

A.V. Kozlova¹, S.P. Buyakova^{1,2}, S.N. Kulkov^{1,2}

¹Tomsk State University, Tomsk, Russia,

²Institute of Strength Physics and Material Science SB RAS, Tomsk, Russia

In this work the sintering of ZrO₂ powders was investigated. Powders were synthesized by chemical precipitation and plasma spray synthesis methods. Chemically precipitated ZrO₂ consisted of dense polycrystalline aggregates with an average size 12 μm. Dioxide of zirconium powder produced by plasma spray synthesis consisted of spherical particles, particles with irregular shape and their agglomerates. During the sintering of green bodies intensive shrinkage occurred regardless of the powder synthesis method. The rate of shrinkage was calculated from the kinetics equation of isothermal shrinkage. It was revealed that the lowest rate of shrinkage was observed for ceramic fabricated from chemically precipitated powder.

P.S.B.4.

SINTERING EFFECTS ON MICROSTRUCTURE AND DIELECTRIC PROPERTIES OF CCTO CERAMICS

S. Marković¹, M. Lukić¹, Č. Jovalekić², S.D. Škapin³, D. Suvorov³, D. Uskoković¹

¹Institute of Technical Sciences of SASA, Belgrade, Serbia, ²Institute for Multidisciplinary Research, Belgrade, Serbia, ³Jožef Stefan Institute, Ljubljana, Slovenia

A perovskite-type compound, calcium copper titanate (CaCu₃Ti₄O₁₂, CCTO) attracted ever-increasing attention for its practical applications in microelectronics, especially for preparation of capacitors and memory devices. CCTO ceramics are very attractive because of their giant dielectric constant (~10⁴–10⁵) in the kilohertz region at room temperature, and their good stability over a wide temperature range from 100 to 600 K.

Here, CCTO powder was prepared by solid state reaction between CaCO₃, CuO and TiO₂ at 1000 °C for 12 hours. Synthesized powder was characterized by XRD, FT-IR and FE-SEM techniques. The sinterability of CCTO powders was investigated by heating microscopy. Powder was uni-axially pressed into pallets (Ø 6 mm) and sintered up to 1100 °C, with 2, 5, 10 and 20 °/min. The recorded shrinkage curves were used for calculation of activation energy for sintering process, and furthermore, for choosing two step sintering (TSS) conditions. By TSS the samples were heated up to 1050 (1070) °C and after retention for 10 min the cooled down to 1000 (1020) °C and kept for 20 h. The microstructure of CCTO ceramics sintered by conventional and TSS techniques was examined by FE-SEM method; the electrical properties were investigated by *ac* impedance spectroscopy over the ranges 1000 - 25 °C and 40 Hz - 5 MHz. Electrical properties of the sintered CCTO ceramics were correlated to the samples microstructure. Finally, we have shown that appropriate choice of sintering conditions is important for preparation of high-quality CCTO ceramics with giant dielectric permittivity.