



**Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION IX
New Frontiers in Multifunctional Material Science and Processing**

**Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials**

PROGRAM AND THE BOOK OF ABSTRACTS

**Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 20-21. September 2021.**

Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION IX
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Science of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials
PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 20-21. September 2021

Book title: Serbian Ceramic Society Conference - ADVANCED CERAMICS AND APPLICATION IX Program and the Book of Abstracts

Publisher:

Serbian Ceramic Society

Editors:

Prof.dr Vojislav Mitić

Dr Lidija Mančić

Dr Nina Obradović

Technical Editors:

Ivana Dinić

Marina Vuković

Printing:

Serbian Ceramic Society, Belgrade, 2021

Edition:

100 copies

CIP - Каталогизacija y yбликацији
Народна библиотека Србије, Београд

666.3/.7(048)

66.017/.018(048)

SRPSKO KERAMIČKO DRUŠTVO. CONFERENCE ADVANCED CERAMICS AND APPLICATION : NEW FRONTIERS IN MULTIFUNCTIONAL MATERIAL SCIENCE AND PROCESSING (9 ;2021 ; BEOGRAD)

Program ; and the Book of abstracts / Serbian Ceramic Society Conference Advanced Ceramics and Application IX : New Frontiers in Multifunctional Material Science and Processing, Serbia, Belgrade, 20-21. September 2021 ; [organized by Serbian Ceramic Society ... [et al.] ; [editors Vojislav Mitić, Lidija Mančić, Nina Obradović]. - Belgrade : Serbian Ceramic Society, 2021 (Belgrade : Serbian Ceramic Society). - 93 str. : ilustr. ; 30 cm

Tiraž 100.

ISBN 978-86-915627-8-6

а) Керамика -- Апстракти б) Наука о материјалима -- Апстракти в) Наноматеријали -- Апстракти

COBISS.SR-ID 45804553

INV

CaCu₃Ti_{4-x}Ru_xO₁₂: Crystal structure, electrical and magnetic properties

Lj. Veselinović^a, M. Mitrić^b, L. Mančić^a, P. M. Jardim^c, S. D. Škapin^d, N. Cvjetičanin^e, S. Marković^a

^aInstitute of Technical Sciences of SASA, Knez Mihailova 35/IV, 11000 Belgrade, Serbia

^bThe Vinča Institute of Nuclear Sciences, Belgrade, Serbia

^c Department of Metallurgical and Materials Engineering, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

^dJozef Stefan Institute, Ljubljana, Slovenia

^eFaculty of Physical Chemistry, University of Belgrade, Studentski Trg 12-16, P.O. Box137, Belgrade, Serbia

The CaCu₃Ti₄O₁₂ belongs to the large ACu₃B₄O₁₂ family of materials. Crystallographic *A* site is most often occupied by alkaline-earth metals or lanthanides, while *B* site is occupied by transition metals. The type of cations that build up the structure strongly affects the properties of these. The CaCu₃Ti₄O₁₂ has been extensively studied due to its high dielectric permittivity stable over a wide temperature and frequency range (up to 10⁵, for 100-600 K and 10²-10⁵ Hz). Because of such characteristics, it has promising application in microelectronics. However, it has been shown that differences in the crystal structure and electrical properties of dielectric ceramics and metallic electrodes, may cause an energy barrier and occurrence of stress on the ceramic-electrode contact which reduces dielectric permittivity. Such stress can be prevented by using dielectric and electrode materials with as much as possible similar crystal structure, especially unit cell parameters. This investigation dealt with detailed structural (XRPD, HRTEM, SAED), dielectric and magnetic study of CaCu₃Ti_{4-x}Ru_xO₁₂ (CCTRO, *x* = 0, 1 and 4) materials. The results of structural refinement show that in cubic symmetry with space group $Im\bar{3}$, both titanium and ruthenium ions occupied crystallographic *B* site. Moreover, the variation in stoichiometry slightly affects the value of the unit cell parameters but changes electrical properties of studied material. Thus, substitution of even one atom of Ru in CaCu₃Ti_{4-x}Ru_xO₁₂ unit cell is enough to change material properties from dielectric to conductor solving the problem of stress appearance on the contact layer of dielectric/electrode in capacitors.