

Programme & The Book of Abstracts

Nineteenth Annual Conference

YUCOMAT 2017

Herceg Novi, Montenegro, September 4-8, 2017

Organised by

MATERIALS RESEARCH SOCIETY OF SERBIA

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NINETEENTH ANNUAL CONFERENCE

YUCOMAT 2017

Hunguest Hotel Sun Resort Herceg Novi, Montenegro,
September 4-8, 2017
<http://www.mrs-serbia.org.rs>

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Organised by:
Materials Research Society of Serbia

Endorsed by:
**Materials Research Society,
European Materials Research Society
and
Federation of European Material Societies**

Title: THE NINETEENTH ANNUAL CONFERENCE
YUCOMAT 2017
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Publisher: Materials Research Society of Serbia
Knez Mihailova 35/IV, P.O.Box 433, 11000 Belgrade, Serbia
Phone: +381 11 2185-437
<http://www.mrs-serbia.org.rs>

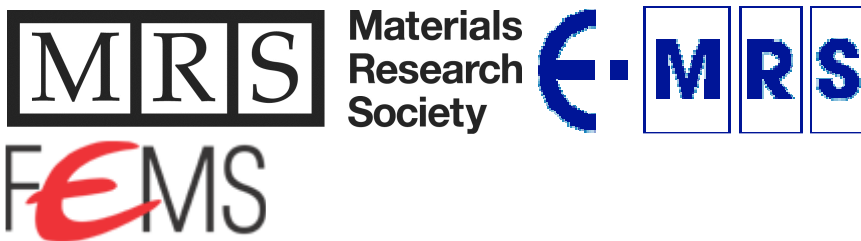
Editors: Prof. Dr. Dragan P. Uskoković and Prof. Dr. Velimir Radmilović

Technical editor: Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić
Front cover: Modified Photo by Mercy; Wikimedia Commons
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Acknowledgments: This conference is celebrating 20 years of MRS-Serbia.



Printed in: Biro Konto
Sutorina bb, Igalo – Herceg Novi, Montenegro
Phones: +382-31-670123, 670025, E-mail: bkonto@t-com.me
Circulation: 220 copies. The end of printing: August 2017

P.S.A.5.

Characterization of pressure-less sintered MgO-Al₂O₃-SiO₂-TeO₂ system

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In this study, sintering of two systems was investigated in parallel, pure cordierite 2MgO:2Al₂O₃:5SiO₂, and cordierite with addition of 5 mass % TeO₂. Green bodies were prepared from powder mixtures mechanically activated for 0, 10 and 40 minutes by uniaxial pressing at 20 MPa followed by cold isostatic pressing (CIP) at 1000 MPa. The pressure-less sintering of these specimens was performed at a temperature of 1350 °C for 1 h, with 10 °C/min heating rate. Densities over 96 % of theoretical values were obtained for samples activated for 40 minutes. XRD measurements of MAS-40 sintered sample pointed at a mixture that consisted of several phases, majority of cordierite (> 73 %), spinel MgAl₂O₄ (> 22 %), ZrSiO₄ (2.5 %), and Al₂O₃ (1.8 %), while XRD pattern of MAS-40-TeO₂ contained majority of cordierite (> 72 %), spinel MgAl₂O₄ (> 23 %), ZrSiO₄ (1.9 %), and Al₂O₃ (1.9 %).

The relative permittivities of the samples were measured in an open test fixture. The results for the real part of the complex relative permittivity of the samples, measured at 200 MHz, are shown in Table I. The loss tangent for all samples was very small, below the resolution of the measurement setup (0.005).

Table I The real part of the complex relative permittivity and the density of the samples.

	MAS-0	MAS-0- TeO ₂	MAS-10	MAS-10-TeO ₂	MAS-40	MAS-40- TeO ₂
ϵ'_r	5.236	4.964	4.963	4.987	5.542	5.554
ρ (g/cm ³)	2.45	2.21	2.32	2.29	2.60	2.56

There is a strong correlation between the relative permittivity and the density, which agrees with our previous results.

CIP- Каталогизација у публикацији
Народна библиотека Србије

66.017/.018(048)

MATERIALS Research Society (Beograd). Conference (19 ; 2017 ; Herceg Novi)

Programme ; and The Book of Abstracts / Nineteenth Annual Conference YUCOMAT 2017, Herceg Novi, September 4-8, 2017 ; organised by Materials Research Society of Serbia, [Belgrade ; editors Dragan P. Uskoković and Velimir Radmilović]. - Belgrade : Materials Research Society of Serbia, 2017 (Herceg Novi : Biro Konto). - XL, 124 str. ; 23 cm

Tiraž 220. - Registar.

ISBN 978-86-919111-2-6

1. Materials Research Society of Serbia (Beograd)

- a) Наука о материјалима - Апстракти
- b) Технички материјали - Апстракти

COBISS.SR-ID 241612044