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

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

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Sep 29th - Oct 1st, 2014, Belgrade, Serbia

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

Publisher:
Serbian Ceramic Society

Editors:
Prof.dr Vojislav Mitić
Prof. dr Olivera Milošević
Dr Nina Obradovic
Dr Lidija Mančić

Technical Editor:
Prof. dr Olivera Milošević

Printing:
Serbian Academy of Sciences and Arts,
Knez Mihailova 35, Belgrade
Format
Pop Lukina 15, Belgrade

Edition:
150 copies

Sculptural Concretes: Rajko D. Blažić, High School-Academy for Arts and Conservation, Serbian Ortodox Church, Belgrade, Serbia

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

666.3/.7(048)
66.017/.018(048)

SERBIAN Ceramic Society (Belgrade). Conference (3rd ; 2014 ; Beograd) Advanced Ceramics and Application : new frontiers in multifunctional material science and processing : program and the book of abstracts / III Serbian Ceramic Society Conference, 29th September - 1st October, Belgrade, 2014 ; [organized by] Serbian Ceramic Society ... [et al.] ; [editors Vojislav Mitić ... et al.]. - Belgrade : Serbian Ceramic Society, 2014 (Belgrade : Serbian Academy of Sciences and Arts). – 139 str. ; 30 cm

Tiraž 150.

ISBN 978-86-915627-2-4

1. Serbian Ceramic Society (Belgrade)
a) Керамика - Апстракти b) Наука о материјалима - Апстракти c) Наноматеријали - Апстракти

COBISS.SR-ID 209985036

INV1

Synthesis and Characterization of Magnesium Hydroxide Nanoparticles *via* Hydrothermal Method

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The interest in the nanostructured magnesium hydroxide ($Mg(OH)_2$) is rapidly growing due to the fact that its physical and chemical properties makes it appropriate for multiple applications. So far, it has been used in medicine, industry, or more recently, in the conservation of cultural heritage. The current research is based on the synthesis and the characterization of functional and nanocrystalline $Mg(OH)_2$ with different particle sizes, morphologies and high purity. The synthesis was carried out via the hydrothermal method using hydrazine hydrate as a precipitator. Moreover, due to it is essential to study the behaviour of this type of nanoparticles under factors as the time of exposition, the relative humidity and CO_2 concentration, they were exposed to controlled atmosphere at high relative humidity (75%RH). The carbonation process was also studied, identifying the different magnesium carbonate polymorphs.The physical and chemical property of synthesized $Mg(OH)_2$ nanoparticles have been characterized by X Ray diffraction (XRD), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), High resolution Transmission electron Microscopy (HR-TEM), thermogravimetry (TG) and differential scanning calorimetry (DSC). The results showed the successful use of this synthesis route to obtain $Mg(OH)_2$ nanostructured with important properties for the preservation of the stone heritage and promising CO_2 adsorption properties.