

Association of Metallurgical Engineers of Serbia
Faculty of Technology and Metallurgy, University of Belgrade
Institute for Technology of Nuclear and Other Mineral Raw Materials
Institute of Chemistry, Technology and Metallurgy
Vinca Institute of Nuclear Sciences
Serbian Foundrymen's Society

MME SEE

2019

Metallurgical & Materials
Engineering Congress
of South-East Europe

BOOK OF ABSTRACTS

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Dragomir Glišić
Branislav Marković
Vaso Manojlović

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PREFACE

The Fourth Metallurgical & Materials Engineering Congress of South-East Europe (MME SEE 2019) is a biannual meeting of scientists, professionals, and specialists working in the fields of metallurgical and materials engineering. The aim of the Congress is to present current research results related to processing/structure/property relationships, advances in processing, characterization, and applications of modern materials.

Congress encompasses a wide range of related topics and presents the current views from both academia and industry: Future of metals/materials industry in South-East European countries; Raw materials; New industrial achievements, developments and trends in metals/materials; Ferrous and nonferrous metals production; Metal forming, casting, refractories and powder metallurgy; New and advanced ceramics, polymers and composites; Characterization and structure of materials; Recycling and waste minimization; Corrosion, coating, and protection of materials; Process control and modeling; Nanotechnology; Sustainable development; Welding; Environmental protection; Education; Accreditation & certification.

The Editors hope that Congress will stimulate new ideas and improve the knowledge in the field of metallurgical and materials engineering.

The Congress is organized jointly by the Association of Metallurgical Engineers of Serbia, Faculty of Technology and Metallurgy, University of Belgrade, Institute for Technology of Nuclear and Other Mineral Raw Materials, Institute of Chemistry, Technology and Metallurgy, Vinca Institute of Nuclear Sciences and Serbian Foundrymen's Society.

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Editors

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SYNTHESIS AND CHARACTERIZATION OF COMPOSITES BASED ON EXPANDED VERMICULITE AND FERRITE SPINELS³

Mladen Bugarcic¹, Milan Milivojevic², Gvozden Jovanovic¹,
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Expanded vermiculite (EV) is clay, a typical 2:1 phyllosilicate which may be easily produced from the mineral vermiculite. After expansion EV withholds vermiculites physical structure but becomes far more porous than vermiculite which is accredited to the huge increase in the intercalation layer thickness. This feature in conjunction with the fact that the intercalation layer enriched by intercalation cations and water was the initial motive for this research, which opened a novel method for spinels synthesis. Intercalation layer of the EV is utilized as a reaction medium for the synthesis of Fe_3O_4 , MnFe_2O_4 , CoFe_2O_4 , and FeCrFeO_4 . While magnetite is synthesized using the co-precipitation method, others are synthesized using hydrothermal co-precipitation method. Composites are then characterized by XRD (X-ray diffraction), FTIR (Fourier transformed infrared spectroscopy), SEM/EDS (scanning electron microscopy with energy dispersing microscopy) that confirmed the presence of the ferrite spinels inside the intercalation layer. After performed synthesis of the spinels, further parameters were determined: the isoelectric point (IEP), the capacity of cation exchange (CEC) and specific surface area (SSA) is calculated using Brunauer–Emmett–Teller (BET) adsorption isotherm of each composite together with matrix material (EV). The composites could be used as potential adsorbents of heavy metals and/or organic pollutants, and this synthesis method could be used for producing numerous compounds that are mainly being produced by solvothermal method or co-precipitation method.

Keywords: expanded vermiculite, mineral composites, hydrothermal alteration, ferrites

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