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

June, 5th - 7th 2019, Belgrade, Serbia
www.mme-see.org

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

Editors:

Dragomir Glišić
Branislav Marković
Vaso Manojlović

June 5 - 7, 2019
Belgrade, Serbia

Editors:

Dragomir Glišić
Faculty of Technology and Metallurgy, University of Belgrade

Branislav Marković
Institute for Technology of Nuclear and Other Mineral Raw Materials

Vaso Manojlović
Faculty of Technology and Metallurgy, University of Belgrade

Technical editor:

Department of Printing Engineering
Faculty of Technology and Metallurgy, University of Belgrade

Published by:

Association of Metallurgical Engineers of Serbia (AMES)

Circulation:

120 copies

Printed by:

Department of Printing Engineering, Faculty of Technology and Metallurgy
Karnegijeva 4, POB 35-03
11 120 Belgrade, Serbia
Tel: +381 11 3370 492

ISBN 978-86-87183-30-8

Supported by:
Ministry of Education, Science and Technological Development
Republic of Serbia

General sponsor:

ZiJin

Sponsors:

Impol Seval

impol
Aluminium Industry
Impol - Seval

Carmeuse

CARMEUSE

Valjaonica bakra Sevojno

Sevojno
VALJAONICA BAKRA
COPPER MILL

Unicom

UNICOM

Scientific Committee

- *Željko Kamberović, Serbia, president*
- *Karlo Raić, Serbia, vice president*
- *Miroslav Sokić, Serbia, vice president*
- Bernd Friedrich, Germany
- Boštjan Markoli, Slovenia
- Branislav Marković, Serbia
- Dimitrios Panias, Greece
- Veljko Đokić, Serbia
- Endre Romhanji, Serbia
- Jarmila Trpčevska, Slovakia
- Jasna Stajić-Trošić, Serbia
- Kemal Delijić, Montenegro
- Marija Korać, Serbia
- Martin Debelak, Slovenia
- Milan T. Jovanović, Serbia
- Mile Đurđević, Austria
- Miljana Popović, Serbia
- Mirjam Jan Blažić, Slovenija
- Nada Štrbac, Serbia
- Natalija Dolić, Croatia
- Nenad Radović, Serbia
- Petar Uskoković, Serbia
- Rebeka Rudolf, Slovenia
- Rossitza Paunova, Bulgaria
- Sanja Martinović, Serbia
- Srđan Marković, Serbia
- Srećko Manasijević, Serbia
- Sveto Cvetkovski, Macedonia
- Tatjana Volkov-Husović, Serbia
- Vesna Maksimović, Serbia
- Vladan Ćosović, Serbia
- Zdenka Zovko-Brodarac, Croatia
- Zijah Burzić, Serbia

Organizing Committee

- Dragomir Glišić
- Aleksandra Patarić
- Nataša Grujić
- Stefan Dikić
- Vaso Manojlović

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.

The Editors would like to thank the Scientific and the Organizing Committee, the Congress Secretariat - CONGREXPO d.o.o. and all those who helped in making the Congress a success.

Special thanks are due to the Ministry of Education, Science and Technological Development of the Republic of Serbia and sponsors for the financial support of the Congress.

Editors

Content

SYNTHESIS AND CHARACTERIZATION OF NEW REFRACTORY COATINGS BASED ON BASALT

Marko Pavlović[1], Marina Dojčinović[1], Radica Prokić-Cvetković[2], Ljubiša Andrić[3]

e-mail: pavlovic.marko38@gmail.com

[1]University of Belgrade, Faculty of Technology and Metallurgy, Karnegijeva 4, 11000 Belgrade, Serbia;
[2] University of Belgrade, Faculty of Mechanical Engineering, Kraljice Marije Street 16, 11000 Belgrade, Serbia;
[3]Institute for Technology of Nuclear and Other Mineral Raw Materials, Franchet d'Esperey 86, 11000 Belgrade, Serbia

Basalt is a hard volcanic rock. Good technical properties make basalt an important raw material for the production of glass and glass-ceramics for the application in various departments of industry. It is a cheap and widespread raw material for the synthesis of different products such as basalt wool, basalt fibers, basalt plastics, composite materials. The new application of basalt is to obtain refractory coatings and application in foundries and protection against fire, corrosion, and erosion. The basic components of the foundry coatings are refractory filler, binder, additives, and solvent. Preparation of basalt-based filler is done by grinding and mechanical activation at grain diameter 20μm. The composition of the coating was determined about the parameters of the casting process and ranged within limits: filler 92-95%; binder 2,2-2,5%; additives 0,5-1,5% and solvent to the density of coating: 2 g/cm^3. Coating suspension with this density showed high sedimentation stability (below 4.5% of precipitated matters for 24h). These foundry coating can enable the development of new methods of casting alloys with casting temperature over 1200^{0}C.

Composition of basalt-based protective coatings was determined by research and ranged within the limits: 80-85% refractory filler, 12-17% binder based on epoxy resin, with organic additives and solvent. To characterize the coating, an ultrasonic vibration method with a stationary sample was used in accordance with the ASTM G32 standard. The mass loss of samples in the function of the cavitation time was monitored. Sample surface degradation level was quantified by using the image analysis. During the test, changes in sample morphology were monitored by means of the scanning electron microscopy method. Cavitation rate was determined as an indicator of the resistance of the coating under the effect of cavitation. It has been shown that the cavitation rate in the case of coatings applied to metal surfaces is higher (v = 0.108 mg/min) than in the case of coatings applied to non-metallic surfaces (v = 0.0435 mg/min). In order to achieve greater resiliency of the coating under the effect of cavitation, good adhesion of the coating and a higher coating thickness are important. Test results can provide an estimate of the resistance of coat layers in similar operating conditions. These coatings are intended for the protection of metallic and non-metallic surfaces, parts of equipment in metallurgy and mining.

Keywords: basalt, refractory coating, cavitation resistance, mass loss, image analysis.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

669(048)
66.017/.018(048)
621.7/.9(048)
METALLURGICAL & Materials Engineering Congress of South-East Europe (2019; Beograd)
Book of Abstracts / Metallurgical & Materials Engineering Congress of South-East Europe (MME SEE 2019), June 5-7, 2019, Belgrade, Serbia ;[organized by] Associa-
tion of Matallurgcal Engineers of Serbia [AMES] ...[et al.] ; editors Dragomir Glišić, Branislav Marković, Vaso Manojlović. Belgrade : Association of Metallurgical Engineers of Serbia (AMES), 2019 (Belgrade : Department of Printing Engineering Faculty of Techology and Matallurgy). - 84 str. : ilustr. ; 25 cm
Tiraž 120. - Registar.
ISBN 978-86-87183-30-8

1. Association of Metallurgical Engineers of Serbia (Beograd)

a) Металургија - Апстракти
b) Технички материјали - Апстракти
c) Наука о материјалима - Апстракти
d) Металопрерађивачка индустрија - Апстракти

COBISS.SR-ID 276890124

Publisher:
Association of Metallurgical Engineers of Serbia
Kneza Miloša 9/IV, Belgrade, Serbia
www.metalurgija.org.rs