

# **International Scientific Practical Conference "Materials Science, Shape-Generating Technologies and Equipment" (ICMSSTE 2020)**

MATEC Web of Conferences Volume 315 (2020)

Yalta, Russia  
25 - 29 May 2020

**Editor:**

**Vladimir V. Belov**

ISBN: 978-1-7138-1443-6

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

This work is licensed under a Creative Commons Attribution 4.0 International License. License details:  
<http://creativecommons.org/licenses/by/4.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2022)

For additional information, please contact EDP Sciences – Web of Conferences at the address below.

EDP Sciences – Web of Conferences  
17, Avenue du Hoggar  
Parc d'Activité de Courtabœuf  
BP 112  
F-91944 Les Ulis Cedex A  
France

Phone: +33 (0) 1 69 18 75 75  
Fax: +33 (0) 1 69 28 84 91

[contact-edps@webofconferences.org](mailto:contact-edps@webofconferences.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

<b>Conducting a Microscopic Analysis of the Powders Obtained by Electroerosion Dispersion of Waste of Steel X13 .....</b>	1
<i>Ageeva E.V., Khardikov S.V., Novikov A.N.</i>	
<b>X-Ray Diffraction Analysis of Electroerosive Powder Materials, Obtained from Waste of Tungsten-Free Hard Alloy Grade KNT16 .....</b>	6
<i>Serebrovsky Vladimir, Sabel'nikov Boris</i>	
<b>The Porosity Study of Sintered Products from Electro-Erosive Materials of Alloy Cr17, Obtained in Lighting Kerosene.....</b>	9
<i>Ageev E.V., Pereverzev A.S., Sysoev A.A.</i>	
<b>X-Ray Microanalysis of Electro-Erosive Powder Materials, Obtained from Tungsten-Nickel-Iron (TNI) Alloy Wastes in Water .....</b>	14
<i>Ageev E.V., Selyutin V.L., Pikalov S.V.</i>	
<b>Managing the Crack Energy Dissipation as a Way to Increase the Durability of Fine-Grained Limestone Concrete .....</b>	19
<i>Belov Vladimir, Kuliaev Pavel, Barkaya Temur</i>	
<b>Investigation of the Effect of Implantation with Iron Ions on the Carbon Content in the Implanted Layer of Structural and Instrumental Materials .....</b>	24
<i>Ovchinnikov Viktor, Lukyanenko Elena, Yakutina Svetlana</i>	
<b>Removal of Residual Stresses in Aircraft Structural Elements by Pulsating Subsonic Gas Flows Treatment.....</b>	29
<i>Kovalenko Gennadiy, Ivanov Denis</i>	
<b>Design of Composite Materials for Clothes .....</b>	36
<i>Koksharov Sergey, Kornilova Nadezhda, Shammut Yulia</i>	
<b>The Use of Non-Metal Materials in the Filler Units of Cooling Towers with Circulating Water Supply System.....</b>	43
<i>Dmitriev Andrey V., Madyshev Ilnur N., Khafizova Aliya I.</i>	
<b>Collecting Finely-Dispersed Particles from the Gas Flow in a Centrifugal Separator with Coaxially Arranged Pipes.....</b>	50
<i>Zinurov Vadim E., Dmitrieva Oksana S., Popkova Oksana S.</i>	
<b>The Evaluation of Possibilities of Modern Level Casting Bindings on the Technological Lignin Basis Practical Appliance.....</b>	57
<i>Svinoroev Yu.A., Dyadichev V.V., Batyshev K.A., Semenov K.G., Dyadichev A.V., Chornobay S.Ye., Menyuk S.G.</i>	
<b>Fracture Features of Dielectric Nanoceramic with Graphene by High-Voltage Discharge.....</b>	64
<i>Kuznetsov Aleksandr, Savenkov Georgii, Stolyarov Vladimir</i>	
<b>Study of the Inhibitory Ability of Inorganic Di- And Polyphosphate Compositions.....</b>	68
<i>Niyazbekova Aktoty, Shakirov Timur, Almagambetova Mayra</i>	
<b>Continuous Production of Multicomponent Powder Mixtures .....</b>	76
<i>Mansour Wasem, Melekhin Denis, Pasko Alexander</i>	
<b>Effect of Sol-Gel Solution Parameters on the Formation of Films on the Surface of Carbon Fibers .....</b>	84
<i>Gallyamova Rida, Safiullin Rustam, Dokichev Vladimir, Musin Fanil</i>	
<b>Investigation of the Effect of Ultrasonic Surface Treatment Before Ion Implantation on the Structure of the Surface Layer of Aluminum Alloy 1201 .....</b>	90
<i>Ovchinnikov Viktor, Kurbatova Irina, Uchevatkina Nadezda</i>	
<b>Wear and Friction Dependence on Grain Size .....</b>	95
<i>Stolyarov Vladimir</i>	
<b>The Growth Mechanism of Ordered Nanoporous Alumina .....</b>	102
<i>Makhmud-Akhunov Marat, Adamovich Artem, Yavtushenko Igor</i>	
<b>Kinetics of Liquid-Phase Shear Exfoliation of Graphite in Synthetic Oils .....</b>	106
<i>A A Alhilo Zaman, Pershin Vladimir, Osipov Aleksey</i>	
<b>Rotor Apparatus Performance in the Production of Graphene-Containing Suspensions .....</b>	112
<i>Al-Jarah Ruaa A., Baranov Andrey, Pasko Anastasiya</i>	
<b>Environmentally Friendly Technology for the Modification of Lubricants with Graphene Nanostructures .....</b>	118
<i>A A Alhilo Zaman, Zhumagalieva Gaukhar, Pasko Tatiana</i>	

<b>Improving Functional and Environmental Performance of Portland Cement-Based Materials by Graphene Nanostructures .....</b>	124
<i>Pershin Vladimir, Mashhadani Ali, Melekhin Denis, Osipov Aleksey</i>	
<b>Analysis of Structure-Forming Role of Phosphogypsum in the Production of Nonfired Cementless Building Composites .....</b>	132
<i>Kukina Olga, Eremin Andrey, Shuvaev Dmitry</i>	
<b>The Deformability of the Stress-Strained Concrete Strips Between the Cracks During the Short-Term Dynamic Loading .....</b>	139
<i>Galyautdinov Zaur, Kumpyak Oleg, Galyautdinov Daud</i>	
<b>The Study of the Ferroconcrete Beams with Thrust on the Foil Bearings During Short-Term Dynamic Loading .....</b>	146
<i>Kumpyak Oleg, Galyautdinov Daud</i>	
<b>Two-Layer Reinforced Concrete Panels with Uniformly Compressed Sections.....</b>	153
<i>Mailyan Dmitry, Blyagoz Alik, Kretinin Konstantin</i>	
<b>Effective Additive for Foam Concrete.....</b>	158
<i>Belov Vladimir, Kuliaev Pavel</i>	
<b>Beneficiated Ponded Fly Ash for Concretes with High Volume Mineral Additions.....</b>	162
<i>Zaichenko Nikolai, Petrik Irina, Zaichenko Liudmila</i>	
<b>Development of a Technology for Producing Ceramic Refractory Material in a Composition of Montmorillonite Clays (bentonite-Like) and Ferrochrome Production Wastes.....</b>	172
<i>Montayev Sarsenbek, Shakeshev Bekbulat, Zharylgapov Sabit</i>	
<b>On the Possibility of Using Lime Dust for the Production of Building Materials of Forced Carbonate Hardening.....</b>	178
<i>Bakhtin Aleksandr, Lyubomirskiy Nikolai, Fedorkin Sergey, Bakhtina Tamara</i>	
<b>Use of Glass Granules to Produce Effective Gypsum Composites .....</b>	186
<i>Petropavlovskaya Victoria, Novichenkova Tatiana, Petropavlovskii Kirill</i>	
<b>Studying the Possibility of Obtaining Heat-Insulating Building Materials Based on Lime Carbonization Hardening and Rice Husk.....</b>	195
<i>Nikolaenko Vitaliy, Lyubomirskiy Nikolai, Nikolaenko Elena, Bakhtin Aleksandr</i>	
<b>The Effect of Biomineral Composition on the Biochemical Parameters of Animal Blood.....</b>	200
<i>Montayeva Nurgul</i>	
<b>The Prospects of Using the Silver Nanoparticles Composition in Sodium Alginate Matrix .....</b>	208
<i>Kubyshkin Anatoly, Pisareva Olga, Bessalova Yevgenia, Fomochkina Irina</i>	
<b>Influence of pH Liquid for Mixing Gypsum Binders on the Strength of Gypsum Composites .....</b>	216
<i>Petropavlovskaya Victoria, Zavadko Maria, Novichenkova Tatiana</i>	
<b>Analysis of Radial-Shear Rolling Process Parameters of Aluminum Alloys Based on FEM Modeling.....</b>	223
<i>Gamin Yury, Koshmin Alexander, Ta Dinh Xuan</i>	
<b>Modeling of the Stamping Process of Box-Type Forging .....</b>	230
<i>Kadymov Vagid, Sosenushkin Evgeny, Yanovskaya Elena</i>	
<b>Residual Life Assessment of Welded Joints in the Girth Weld Root .....</b>	236
<i>Shron Leonid, Bogutsky Vladimir, Yagyaev Elmar, Tabolin Illa</i>	
<b>The Study of the Regularities of Structure Formation and Properties of the L-PBF Metal as a Set of Processes on the Way to Create a Controlled Structure.....</b>	244
<i>Shakirov Ivan, Kuznetsov Pavel, Staritsyn Mikhail, Zhukov Anton, Bobyr Vitaliy</i>	
<b>Single-Stage Polystyrene Concrete 3D Printing Technology .....</b>	251
<i>Molodin Victor, Gasenko Ivan, Timin Pavel</i>	
<b>Author Index</b>	