

# **International Conference on Oil and Gas Engineering (OGE-2016)**

Procedia Engineering Volume 152

Omsk, Russia  
25 - 30 April 2016

## **Editors:**

**Alexander V. Myshlyavtsev**  
**Vladimir A. Likholobov**  
**Vladimir L. Yusha**

ISBN: 978-1-5108-2856-8

**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.**

Copyright© by Elsevier B.V.  
All rights reserved.

Printed by Curran Associates, Inc. (2016)

For permission requests, please contact Elsevier B.V.  
at the address below.

Elsevier B.V.  
Radarweg 29  
Amsterdam 1043 NX  
The Netherlands

Phone: +31 20 485 3911  
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

**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>PREFACE</b> .....	1
<i>Alexander Myshlyavtsev</i>	
<b>QUANTUM-CHEMICAL MODELING OF BENZENE WITH ETHYLENE ALKYLATION REACTIONS USING LIQUID-PHASE CATALYST</b> .....	2
<i>E. S. Khlebnikova, E. N. Ivashkina, K. Pappel</i>	
<b>SORPTION RECOVERY OF PLATINUM METALS FROM COMPOUND SOLUTIONS</b> .....	8
<i>A. A. Miroshnichenko</i>	
<b>THE TECHNOLOGY REFINEMENT OF SOIL DECONTAMINATION CONTAMINATED WITH PETROLEUM PRODUCTS BY THE REAGENT CAPSULATION METHOD</b> .....	13
<i>L. O. Shtripling, E. G. Kholkin, K. S. Larionov</i>	
<b>EFFECT OF GROUP COMPOSITION OF THE VACUUM DISTILLATE FROM HEAVY KAZAKHSTAN AND WEST SIBERIAN OIL ON THE YIELD OF LIGHT FRACTIONS DURING THE CATALYTIC CRACKING</b> .....	18
<i>G. Y. Nazarova, E. N. Ivashkina, E. D. Ivanchina, V. I. Stebeneva, G. Zh. Seytenova</i>	
<b>INCREASING THE EFFICIENCY OF LIQUID PHASE ALKYLATION OF BENZENE WITH PROPYLENE USING THE METHOD OF MATHEMATICAL MODELING</b> .....	25
<i>A. A. Chudinova, N. I. Buchatskaya, E. N. Ivashkina, A. A. Salischeva, A. A. Gavrikov, A. E. Nurmakanova, E. S. Khlebnikova</i>	
<b>PARTICLE SWARM OPTIMIZATION FOR INVERSE CHEMICAL KINETICS PROBLEM SOLVING AS APPLIED TO N-HEXANE ISOMERIZATION ON SULFATED ZIRCONIA CATALYSTS</b> .....	34
<i>K. V. Kazantsev, L. I. Bikmetova, O. V. Dzhikiya, M. D. Smolikov, A. S. Belyi</i>	
<b>OPTICAL PROPERTIES RESEARCH OF CADMIUM SULPHIDE NANOPARTICLES RECEIVED BY THE INTERACTION OF THE REVERSE EMULSIONS BASED ON SODIUM BIS(2-ETHYLHEXYL) SULFOSUCCINATE</b> .....	40
<i>O. A. Fedyaeva, E. G. Poshelyuzhnaya, M. V. Trenikhin, V. A. Zakharov, D. A. Kuleshov, T. E. Fisenko, I. A. Lutayeva</i>	
<b>MODELING OF TRANSALKYLATION STAGE OF ETHYLBENZENE MANUFACTURING WITH ZEOLITE-CATALYSTS</b> .....	45
<i>S. A. Koshkin, L. A. Ignatova, E. N. Ivashkina, I. O. Dolganova</i>	
<b>THE RESEARCH OF <math>(\text{NH}_4)_2\text{BEF}_4</math> SOLUTION PURIFICATION EFFECTIVENESS</b> .....	51
<i>A. N. Dyachenko, R. I. Kraydenko, I. V. Petlin, L. N. Malyutin</i>	
<b>CATALYTIC COATINGS FOR IMPROVING THE ENVIRONMENTAL SAFETY OF INTERNAL COMBUSTION ENGINES</b> .....	59
<i>A. R. Osipov, V. A. Borisov, G. I. Suprunov, V. A. Mukhin, A. L. Ivanov, S. S. Sigaeva, E. A. Anoshkina, V. L. Temerev, A. A. Hohlov, P. G. Tsyryl'Nikov</i>	
<b>DISTRIBUTION OF ACTIVE SITE TYPES ON AU NANOPARTICLES WITH DIFFERENT STRUCTURES: STUDY OF THERMAL DEPENDENCE</b> .....	67
<i>A. I. Svalova, P. V. Stishenko</i>	
<b>APPLICATION OF MATHEMATICAL MODELING FOR OPTIMIZATION OF LINEAR ALKYL BENZENES SULPHONATION MODES IN FILM REACTOR</b> .....	73
<i>E. Ivanchina, E. Ivashkina, I. Dolganova, I. Dolganov, A. Krutyy</i>	
<b>MATHEMATICAL MODELING SULFURIC ACID CATALYZED ALKYLATION OF ISOBUTANE WITH OLEFINS</b> .....	81
<i>E. N. Ivashkina, E. D. Ivanchina, A. E. Nurmakanova, S. S. Boychenko, A. S. Ushakov, I. O. Dolganova</i>	
<b>SUPPORTED SULFATED ZIRCONIA CATALYSTS FOR ISOMERIZATION OF N-HEXANE</b> .....	87
<i>L. I. Bikmetova, M. D. Smolikov, E. V. Zatolokina, K. V. Kazantsev, V. Yu. Tregubenko, A. S. Belyi</i>	
<b>THE EFFECT OF PLATINUM CONTENT AND ELECTRONIC STATE IN PT/<math>\text{WO}_3</math>/ZRO<sub>2</sub> CATALYSTS ON ISOMERIZATION OF N-HEPTANE</b> .....	94
<i>V. A. Shkurenok, M. D. Smolikov, S. S. Yablokova, D. I. Kir'Yanov, E. A. Paukshtis, S. V. Koscheev, T. I. Gulyaeva, A. S. Belyi</i>	
<b>THE EFFECT OF SUPPORT TYPE (<math>\text{Al}_2\text{O}_3</math>, <math>\text{SiO}_2</math>) AND FEATURES OF THE SUPPORTED METAL (PD, RE, IR) ON THE JOINT CONVERSION OF METHANE AND N-PENTANE</b> .....	101
<i>N. V. Vinichenko, D. V. Golinsky, V. V. Pashkov, E. V. Zatolokina, A. V. Dvoyan, T. I. Gulyaeva, M. V. Trenikhin, O. V. Krol, A. S. Belyi</i>	

<b>A STUDY OF PD/C CATALYSTS IN THE LIQUID-PHASE HYDROGENATION OF 1,3,5-TRINITROBENZENE AND 2,4,6-TRINITROBENZOIC ACID. SELECTION OF HYDROGENATION CONDITIONS FOR SELECTIVE PRODUCTION OF 1,3,5-TRIAMINOBENZENE</b> .....	110
<i>O. B. Belskaya, R. M. Mironenko, V. P. Talsi, V. A. Rodionov, S. V. Sysolyatin, V. A. Likhobobov</i>	
<b>ISOMERIZATION OF N-HEXANE ON PD/SO<sub>4</sub><sup>2-</sup>/ZRO<sub>2</sub>/AL<sub>2</sub>O<sub>3</sub> AND MECHANICAL MIXTURES PD/AL<sub>2</sub>O<sub>3</sub> (PD/SIO<sub>2</sub>) + SO<sub>4</sub><sup>2-</sup>/ZRO<sub>2</sub>/AL<sub>2</sub>O<sub>3</sub></b> .....	116
<i>O. V. Dzhikiya, M. D. Smolikov, E. V. Zatolokina, K. V. Kazantsev, A. S. Belyi</i>	
<b>BIOLOGICAL REMEDIATION OF THE PETROLEUM AND DIESEL CONTAMINATED SOIL WITH EARTHWORMS EISENIA FETIDA</b> .....	122
<i>S. B. Chachina, N. A. Voronkova, O. N. Baklanova</i>	
<b>MATHEMATICAL MODELING OF THE CARBON BURN-OUT PROCESS FROM THE SHALE SEMI-COKE SURFACE OF AEROFOUNTAIN TECHNOLOGICAL FURNACE IN THE SOLID HEAT-CARRIER OIL SHALE SEMI-COKING SCHEME</b> .....	134
<i>A. A. Selivanov, P. A. Batrakov, A. N. Mrakin, A. A. Morev</i>	
<b>THE RECEIPT AND INVESTIGATION OF LIPOSOMAL STRUCTURES WITH BIOLOGICALLY ACTIVE SUBSTANCES</b> .....	140
<i>E. G. Shubenkova, O. P. Chzhu</i>	
<b>THE NITROGEN OXIDE FORMATION STUDYING AT NATURAL GAS COMBUSTION IN NON-CIRCULAR PROFILE FURNACES OF FIRE-TUBE BOILERS</b> .....	144
<i>P. A. Batrakov</i>	
<b>EVALUATION OF GAS PRODUCTS EMISSION KINETIC CONSTANTS UNDER SULFUR OIL SHALE THERMAL DECOMPOSITION</b> .....	151
<i>V. F. Simonov, A. A. Selivanov, A. N. Mrakin, A. A. Morev</i>	
<b>THE INNOVATIVE DESIGN OF THE DISPERSER FOR SEPARATING PARTICLES OF OIL</b> .....	158
<i>A. F. Sekachev, V. S. Deeva, S. M. Slobodyan, V. S. Teterin, R. N. Ivanov, V. V. Shalay, K. V. Shcherban</i>	
<b>THE POSSIBILITY OF INCREASING EMISSION INTENSITY OF A COUNTER-CURRENT HYDRODYNAMIC GENERATOR</b> .....	163
<i>A. A. Kapelyuhovskiy</i>	
<b>TURBO-REFRIGERATORS USING FOR COOLING THE CRYOTHERAPEUTIC UNITS</b> .....	169
<i>A. Y. Baranov, T. A. Malysheva</i>	
<b>LIFECYCLE COSTS FOR ENERGY EQUIPMENT: FMECA &amp; LIFECYCLE COSTING MODELS AS "DECISION MAKING" TOOLS FOR COST REDUCTION DURING THE WHOLE EQUIPMENT LIFE</b> .....	173
<i>A. E. Brom, O. V. Belova, A. Sissinio</i>	
<b>LIFECYCLE COSTS FOR ENERGY EQUIPMENT FMECA FOR GAS TURBINE</b> .....	177
<i>A. E. Brom, I. N. Omelchenko, O. V. Belova</i>	
<b>THEORETICAL RESEARCHES OF RAMMER'S OPERATING ELEMENT DYNAMICS IN A SOIL FOUNDATION OF OIL AND OIL PRODUCTS STORAGE TANK</b> .....	182
<i>A. V. Gruzin, V. V. Gruzin, V. V. Shalay</i>	
<b>CONTROLLING HYDRODYNAMIC GENERATOR EMISSION INTENSITY AT THE EDGE TONE FREQUENCY</b> .....	190
<i>A. A. Kapelyuhovskiy, Yu. A. Buryan, A. A. Kapelyuhovskaya</i>	
<b>EXPERIMENTAL RESEARCH RESULTS OF THE SLOT SEAL CONSTRUCTED AS HYDRODIODE FOR THE HYBRID POWER PISTON VOLUMETRIC MACHINE</b> .....	197
<i>A. Yu. Kondyurin, V. E. Shcherba, V. V. Shalai, E. A. Lysenko, G. A. Nesterenko, Val. I. Surikov</i>	
<b>VERIFICATION OF CFD MODELING FOR ROTOR TYPE OF RECUPERATION ENERGY</b> .....	205
<i>A. E. Aleshin, A. K. Rubtsov</i>	
<b>ABOUT LNG ENERGY UTILIZATION EFFICIENCY ESTIMATION</b> .....	209
<i>E. V. Blagin, D. A. Uglanov, A. I. Dovgyallo</i>	
<b>EFFICIENCY CRITERIA AND COMPARATIVE ANALYSIS OF COMBINED ENERGY PLANTS UTILIZING LNG COLD ENERGY</b> .....	219
<i>E. V. Blagin, A. A. Shimanov, A. I. Dovgyallo, D. A. Uglanov</i>	
<b>THE ANALYSIS OF ANSYS PACKAGE APPLICABILITY FOR CALCULATING THE ELEMENTS OF THE HEAT LOSSES RECUPERATION SYSTEM IN THE POWER UNIT OF THE MOBILE COMPRESSOR UNIT</b> .....	226
<i>G. I. Chernov, V. K. Vasilyev, P. D. Balakin, A. M. Kalashnikov</i>	
<b>IMPROVING GAS COOLING TECHNOLOGY AT ITS COMPRESSION IN THE BOOSTER COMPRESSOR STATION</b> .....	233
<i>I. A. Yanvarev, A. D. Vanyashov, A. V. Krupnikov</i>	

<b>THE FATIGUE SURFACE CRACKS GROWTH MODEL TAKING INTO ACCOUNT PLASTIC DEFORMATIONS FOR A CYLINDER OF A LOW-SPEED LONG-STROKE COMPRESSOR</b> .....	240
<i>K. A. Vansovich, I. P. Aistov, V. I. Yadrov</i>	
<b>ANALYSIS OF CORROSION DEFECTS ON OIL PIPELINE SURFACE USING SCANNING ELECTRON MICROSCOPY AND SOIL THIONIC AND SULFATE-REDUCING BACTERIA QUANTIFICATION</b> .....	247
<i>M. G. Chesnokova, V. V. Shalaj, Y. A. Kraus, N. V. Cherkashina, A. Yu. Mironov</i>	
<b>FINITE ELEMENT ANALYSIS OF DISCHARGE ANTIVIBRATIONAL PIPE STRESS STATE OF THE PIPING SYSTEM FLEXIBLE JOINT</b> .....	251
<i>V. G. Tsyss, M. Yu. Sergaeva</i>	
<b>THE THERMODYNAMIC EFFICIENCY OF ENERGY COMPLEX ENTERPRISES PROCESSING RAW GAS CONDENSATE</b> .....	258
<i>I. V. Dolotovskiy, E. A. Larin, N. V. Dolotovskaya</i>	
<b>CALCULATION OF SPINDLE OF PIPELINE FITTINGS ON THE LONGITUDINAL STABILITY</b> .....	265
<i>N. E. Proskuriakov, I. V. Lopa</i>	
<b>THEORETICAL ANALYSIS OF CHANGING GAS DYNAMIC CHARACTERISTICS OF THE DUST FILTER WITH A SHORT DIFFUSER WHILE IN OPERATION</b> .....	270
<i>N. Yu. Filkin, V. L. Yusha</i>	
<b>PNEUMATIC CAPSULE TRANSPORT</b> .....	276
<i>O. V. Belova, M. D. Vulf</i>	
<b>THE APPLICATION OF COMPACT THERMISTORS FOR THE TEMPERATURE CONDITIONS ANALYSIS OF SMALL-SIZED LONG-STROKE LOW-SPEED STAGES OF PISTON COMPRESSORS</b> .....	281
<i>R. Yu. Goshlya, S. S. Busarov, A. Yu. Gromov, A. V. Nedovenchany, I. S. Busarov</i>	
<b>CONSTRUCTIONAL DESIGN OF POLYMERIC COOLED BEARINGS</b> .....	288
<i>N. A. Raykovskiy, V. L. Yusha, D. V. Zyulin, S. A. Abramov</i>	
<b>THE EXPERIMENTAL RESEARCH OF THE THERMAL CONDITIONS IN SLOW SPEED STAGE OF AIR RECIPROCATING COMPRESSOR</b> .....	297
<i>V. L. Yusha, S. S. Busarov, R. Yu. Goshlya, A. V. Nedovenchanyi, B. S. Sazhin, M. A. Chizhikov, I. S. Busarov</i>	
<b>THERMAL STRESS STATE OF THE PARTS OF QUASI-ISOTHERMAL LONG-STROKE LOW FLOW STAGES IN RECIPROCATING COMPRESSORS</b> .....	303
<i>S. S. Busarov, A. V. Tretyakov, K. V. Sherban, P. D. Balakin</i>	
<b>DEFINING RELATIONSHIPS FOR REINFORCING SHELL ELEMENTS OF A RUBBER-CORD COMPOSITE</b> .....	309
<i>S. A. Korneev, V. S. Korneev, I. A. Penkov</i>	
<b>NUMERICAL INVESTIGATION ON A 70 HZ PULSE TUBE MICRO-CRYOCOOLER</b> .....	314
<i>S. O. Nekrasova, E. A. Zinovyev, A. I. Dovgyallo</i>	
<b>FINITE ELEMENT RESEARCH OF RUBBER-CORD FLAT COUPLING</b> .....	321
<i>V. S. Korneev, D. A. Romanyuk, S. A. Korneev, G. S. Russkih, M. V. Vaskova</i>	
<b>THE CALCULATION FEATURES OF CONSECUTIVELY SWITCHED ON CONDENSERS AT THEIR COMPOSITE COOLING</b> .....	327
<i>V. A. Maksimenko, A. N. Fot</i>	
<b>SIMULATING OF THE COMPOSITE CYLINDRICAL SHELL OF THE PIPE OF THE SUPPLY PIPELINES BASED ON ANSYS PACKAGE</b> .....	332
<i>V. G. Tsyss, M. Yu. Sergaeva</i>	
<b>THE EFFICIENCY ANALYSIS FOR THE HEAT LOSSES RECUPERATION SYSTEM OF THE MOBILE REFRIGERATION UNIT</b> .....	339
<i>V. L. Yusha, G. I. Chernov, D. H. Sadvakasov</i>	
<b>ANALYSIS OF RATIO INFLUENCE OF DISCHARGE AND SUCTION PRESSURE ON OPERATING PROCESSES ON HYBRID POWER PISTON VOLUMETRIC MACHINES</b> .....	348
<i>I. E. Lobov, V. Ye. Shcherba, V. V. Shalai, Ye. A. Pavlyuchenko, A. V. Grigoriev</i>	
<b>THE USE OF LOW-TEMPERATURE POTENTIAL OF THE ENVIRONMENT IN ENERGY-EFFICIENT REFRIGERATION SUPPLY TECHNOLOGIES OF THE ENTERPRISES OF GC “TITAN”</b> .....	361
<i>M. A. Sutyaginsky, V. A. Maksimenko, Yu. A. Potapov, A. P. Suvorov, V. N. Dubok</i>	
<b>THE HEATING FURNACES OPERATING PARAMETERS OPTIMIZATION ISSUE</b> .....	366
<i>A. M. Paramonov</i>	
<b>MATHEMATICAL MODELING OF THE FLUID FLOW IRREGULARITY WITHIN VACUUM DNA SEPARATION INSTALLATION CELLS</b> .....	372
<i>A. S. Pugachuk, A. Yu. Ten, Yu. A. Borisov, A. V. Chernyshev</i>	
<b>THE DEVELOPMENT OF THE VORTEX GAS PRESSURE REGULATOR</b> .....	380
<i>A. Yu Uss, A. V. Chernyshev</i>	

<b>INFLUENCE ANALYSIS OF FLOW ENTRY CONDITIONS ON THE CENTRIFUGAL COMPRESSOR IMPELLER BLADES TO INTEGRAL GASODYNAMIC CHARACTERISTICS IN A COMBINE REGULATION METHOD .....</b>	<b>389</b>
<i>A. D. Vanyashov, V. V. Karabanova, E. M. Vasenko</i>	
<b>THE ANALYSIS OF THE CONDENSATION PROCESS IMPACT ON THE VACUUM BOILER OPERATING EFFICIENCY .....</b>	<b>395</b>
<i>E. N. Slobodina, A. G. Mikhailov</i>	
<b>THE PECULIARITIES OF THE BOILING PROCESS AT SUBATMOSPHERIC PRESSURE.....</b>	<b>400</b>
<i>E. N. Slobodina</i>	
<b>FRACTAL APPROACH FOR THE "TEETH ENDS - FOOTSTEP" FRICTION COUPLE LOADS ESTIMATION OF THE LONG - STROKE LOW - SPEED COMPRESSORS COOLING SYSTEM PUMP .....</b>	<b>406</b>
<i>I. P. Aistov, A. V. Svishchev</i>	
<b>THE FORECASTING OF THE SINGLE-ROW RECIPROCATING EXPANDER TEMPERATURE FIELDS.....</b>	<b>412</b>
<i>I. K. Prilutskiy, A. I. Prilutskiy, A. A. Snazin, M. A. Molodov</i>	
<b>THE RELEVANCE OF STUDYING SOIL BIOCORROSIVE ACTIVITY IN ESTABLISHING AN INTEGRATED ACTION CRITERION COMBINED EFFECT OF CORROSION FACTORS .....</b>	<b>420</b>
<i>M. G. Chesnokova, V. V. Shalaj, A. S. Kriega</i>	
<b>ANALYSIS OF INFLUENCE OF SCREW COMPRESSOR CONSTRUCTION PARAMETERS AND WORKING CONDITION ON ROTOR TEMPERATURE FIELDS .....</b>	<b>423</b>
<i>T. N. Mustafin, R. R. Yakupova, A. V. Burmistrova, M. S. Khamidullina, I. G. Khisameeva</i>	
<b>GAS RECIRCULATION IMPACT ON THE NITROGEN OXIDES FORMATION IN THE BOILER FURNACE .....</b>	<b>434</b>
<i>V. V. Shalaj, A. G. Mikhajlov, E. E. Novikova, S. V. Terebilov, T. V. Novikova</i>	
<b>SUPERFLUID HELIUM CRYOSTAT FOR SENSITIVE ELEMENTS COOLING.....</b>	<b>439</b>
<i>V. I. Karagusov, S. L. Levin, V. V. Svjatyj, R. Ju. Goshlja, I. V. Karagusov</i>	
<b>THE EVALUATION OF THE THERMOACOUSTIC COOLER APPLICATION FOR LNG VAPOR RECONDENSATION .....</b>	<b>446</b>
<i>V. I. Karagusov, I. V. Karagusov</i>	
<b>APPLICATION OF NUMERICAL METHODS FOR CALCULATION OF WORKING PROCESSES IN PNEUDRAULIC DEVICES.....</b>	<b>454</b>
<i>V. A. Vasilieva, A. V. Chernyshev</i>	
<b>RESEARCH OF DESIGN PARAMETERS INFLUENCE ON THE OPERATION CHARACTERISTICS OF SOLUTION CONCENTRATOR .....</b>	<b>459</b>
<i>Y. A. Borisov, A. S. Pugachuk, A. V. Chernyshev</i>	
<b>THE SEM APPLICATION FOR DIAGNOSTICS OF POLYETHYLENE FILMS SUITABILITY FOR INFORMATION RECORDING BY THERMAL PRINTING .....</b>	<b>464</b>
<i>I. V. Nagornova, L. G. Varepo, E. B. Babluyk, A. P. Kondratov</i>	
<b>EXPRESS DIAGNOSTICS OF POLYMERIC PETROLEUM PRODUCTS FOR ITS USAGE IN LATENT WATERMARKS OF THE SMART PACKAGING .....</b>	<b>469</b>
<i>A. P. Kondratov, L. G. Varepo, I. N. Ermakova</i>	
<b>ZINK SELENIDE NANOFILMS APPLICATION IN CARBON MONOXIDE DETECTION .....</b>	<b>474</b>
<i>S. O. Podgorniy, O. T. Podgornaya, E. D. Skutin, I. P. Demeshko, O. V. Lukoyanova, K. I. Fedotova</i>	
<b>REVISITING THE QUALITY CONTROL OF INK LAYER.....</b>	<b>478</b>
<i>L. G. Varepo, O. V. Trapeznikova, E. V. Trapeznikov, I. V. Nagornova</i>	
<b>USING ADAPTIVE ALGORITHMS BASED OF FUZZY LOGIC IN VIBRATION DIAGNOSTIC SYSTEMS .....</b>	<b>482</b>
<i>V. N. Kostyukov, A. V. Zaytsev</i>	
<b>ACCURACY FORECASTING DISKS MANUFACTURING OF AXIAL POWER MACHINES CONSIDERING THE FORCES AT THE INDUSTRIAL PROCESS SYSTEM .....</b>	<b>487</b>
<i>G. A. Nesterenko, I. S. Nesterenko, E. A. Lysenko</i>	
<b>EXPANDING ANALYTICAL POTENTIAL OF HYBRID SENSOR ARRAYS.....</b>	<b>493</b>
<i>E. D. Skutin, S. O. Podgorniy, A. E. Zemtsov, O. V. Gaberkorn</i>	
<b>ABOUT THE EXPERIENCE IN OPERATION OF RECIPROCATING COMPRESSORS UNDER CONTROL OF THE VIBRATION MONITORING SYSTEM.....</b>	<b>497</b>
<i>V. N. Kostyukov, A. P. Naumenko</i>	
<b>CENTRIFUGAL PUMPS IN DOWNSTREAM: OPERATIONAL SAFETY INCREASE .....</b>	<b>505</b>
<i>V. N. Kostyukov, E. V. Tarasov</i>	
<b>SELECTION OF COHERENT FREQUENCY COMPONENTS OF VIBROACOUSTIC SIGNALS FROM ASSEMBLIES OF ROTOR MACHINERY .....</b>	<b>511</b>
<i>V. N. Kostyukov, C. H. Boychenko, A. O. Teterin</i>	

<b>SEARCH TECHNIQUE OF OPTIMAL OPERATION PROCEDURES FOR ROLLING BEARINGS FOR DIAGNOSTICS PURPOSES</b> .....	516
<i>V. N. Kostyukov, D. V. Kazarin, V. V. Basakin</i>	
<b>USAGE OF CHARACTERISTIC FUNCTION AS INFORMATIVE DIAGNOSTIC FEATURE</b> .....	521
<i>V. N. Kostyukov, A. P. Naumenko, I. S. Kudryavtseva</i>	
<b>INTELLIGENT MACHINERY CONDITION MONITORING BASED ON ADAPTIVE MEASUREMENTS</b> .....	527
<i>V. N. Kostyukov, A. V. Kostyukov, C.H. Boychenko</i>	
<b>SHAFT SENSOR BASED ON MODELING DIAGNOSTIC SIGNS OF POWER UNIT DEFECTS</b> .....	531
<i>A. I. Kumenko, N. Yu. Kuzminykh, A. V. Timin</i>	
<b>NEW APPLICATIONS OF CARBON BLACK. AN AEROGEL-LIKE COMPOSITE MATERIAL WITH HEAT INSULATING PROPERTIES</b> .....	540
<i>O. A. Kokhanovskaya, G. I. Razdyakonova, V. A. Likholobov</i>	
<b>POLYMER NANOCOMPOSITES DEVELOPMENT AND RESEARCH FOR PETROCHEMICAL AND OIL AND GAS PRODUCTION EQUIPMENT</b> .....	545
<i>Y. K. Mashkov, V. A. Egorova, O. V. Chemisenko, O. V. Maliy</i>	
<b>THE SURFACE ACTIVITY FORECAST IMPLEMENTATION OF THE SEMICONDUCTOR MATERIALS ZNTE (A<sup>III</sup>B<sup>V</sup>) AND ZNTE (A<sup>II</sup>B<sup>IV</sup>) FOR THE GAS ANALYSIS</b> .....	551
<i>I. A. Kirovskaya, L. V. Novgorodtseva, B. A. Kosarev, M. A. Zverev</i>	
<b>EFFECT OF THE STRUCTURE OF HYDROGENATED BUTADIENE-NITRILE RUBBER ON THE RESISTANCE TO AGGRESSIVE MEDIA AND HIGH TEMPERATURES</b> .....	556
<i>E. A. Khorova, G. I. Razdyakonova, S. Ya. Khodakova</i>	
<b>THE EFFECT OF FUNCTIONAL GROUPS OF CARBON BLACK ON RUBBER PROPERTIES</b> .....	563
<i>M. N. Nagornaya, G. I. Razdyakonova, S. Ya. Khodakova</i>	
<b>STRUCTURING PECULIARITIES OF POLYTETRAFLUOROETHYLENE MODIFIED WITH BORON NITRIDE WHEN ACTIVATED WITH ULTRASONIC EXPOSURE</b> .....	570
<i>D. A. Negrov, E. N. Eremin</i>	
<b>DIFFUSION MECHANISMS IN BINARY ‘STEEL–COATING’ SYSTEMS UNDER LONG–TERM HIGH TEMPERATURE EXPOSURES</b> .....	576
<i>D. V. Postnikov, A. I. Blesman, I. A. Logachev, A. I. Logacheva, E. A. Tkachenko, D. A. Polonyankin</i>	
<b>THE PROPERTIES OF CHROMIUM STEEL OVERLAYING USED AS A HARDENING COATING FOR STOP VALVE SEALING SURFACE</b> .....	582
<i>E. N. Eremin, A. S. Losev, V. V. Akimov</i>	
<b>SIMULATION OF INTERNAL STRESSES AT THE METALS AND ALLOYS RADIATION WITH CHARGED PARTICLE BEAMS</b> .....	589
<i>E. A. Tkachenko, D. V. Postnikov, I. A. Logachev, A. I. Logacheva, A. I. Blesman, D. A. Polonyankin</i>	
<b>ANTI-CORROSION WEAR-RESISTANT COATINGS ON PARTS OF OIL FIELD EQUIPMENT</b> .....	594
<i>E. N. Eremin, V. M. Yurov, M. K. Ibatov, S. A. Guchenko, V. Ch. Laurynas</i>	
<b>NANOSILICA MODIFIERS FOR CEMENT MORTARS</b> .....	601
<i>V. A. Khomich, S. A. Emralieva, M. V. Tsyguleva</i>	
<b>ANTI-FRICTION SUPERHARD COATINGS FOR DRILL BITS AND BORING CUTTERS</b> .....	608
<i>E. N. Eremin, V. M. Yurov, S. A. Guchenko, V. Ch. Laurynas, S. S. Kasymov</i>	
<b>THE DEVELOPMENT OF THE ALLOY FOR AN OIL PYROLYSIS FURNACE COIL HANGER</b> .....	613
<i>E. N. Eremin, Y. O. Filippov, G. N. Minnekhanov, V. V. Akimov</i>	
<b>COMPUTATIONAL EXPERIMENTAL STUDIES ON MAGNETOELASTIC EFFECTS IN A METAL FILLED ELASTOMER</b> .....	620
<i>G. S. Russkikh</i>	
<b>THE ORIGINAL CORRELATIONS IN THE STRUCTURAL PROPERTIES AND SURFACE ACTIVITY CHANGES OF THE CDSE-CDTE SYSTEM SEMICONDUCTORS</b> .....	627
<i>I. A. Kirovskaya, T. L. Bukashkina, D. A. Polonyankin</i>	
<b>RAPID SURFACE SENSITIVITY AND SELECTIVITY DETERMINATION OF NEW MATERIALS BASED ON CDS, ZNS</b> .....	634
<i>I. A. Kirovskaya, E. V. Mironova, A. A. Grigan, S. N. Pogodin, K. S. Zhansakova</i>	
<b>SYNTHESIS AND RESEARCH OF MODIFIED CARBON SORBENTS WITH HYDROXY ACIDS</b> .....	639
<i>L. G. P’Yanova, A. V. Sedanova, M. S. Drozdetskaya</i>	
<b>OPPORTUNITIES OF SEARCHING NEW MATERIALS OF ECOLOGICAL APPLICATION ON THE BASIS OF STRUCTURAL INVESTIGATIONS OF SEMICONDUCTORS IN THE SYSTEM CDTE-CDS</b> .....	647
<i>I. A. Kirovskaya, P. E. Nor, A. I. Blesman</i>	
<b>DEVELOPMENT OF CARBON SORBENTS BASED ON NANODISPERSED CARBON USING BIOTECHNOLOGY</b> .....	655
<i>L. G. P’Yanova, L. K. Gerunova, V. A. Likholobov, A. V. Sedanova, V. I. Okolelov, A. V. Lavrenov</i>	

<b>THE SYSTEM BINARY COMPONENTS CDSE - A<sup>II</sup>B<sup>VI</sup> IMPACT ON SURFACE ACTIVITY</b> .....	664
<i>I. A. Kirovskaya, M. V. Vasina, V. E. Leonov, O. Y. Brueva</i>	
<b>OPTIMIZING THE CONDITIONS OF MECHANOCHEMICAL SYNTHESIS OF LIAL LAYERED HYDROXIDES</b> .....	672
<i>L. N. Stepanova, O. B. Belskaya, O. N. Baklanova, A. V. Vasilevich, V. A. Likhobolov</i>	
<b>OBTAINING HETERO- SUBSTITUTED SEMICONDUCTOR MATERIALS (ZNSE)<sub>X</sub> (CDS)<sub>1-X</sub> AND THEIR CRYSTALLOCHEMICAL AND STRUCTURAL PROPERTIES</b> .....	681
<i>I. A. Kirovskaya, E. V. Mironova, O. V. Ushakov, A. A. Deeva, A. V. Yurieva</i>	
<b>INFLUENCE OF MULTI-WALLED CARBON NANOTUBES IN CARBON BLACK MIXTURE ON RUBBER PROPERTIES</b> .....	689
<i>N. S. Mitryaeva, S. S. Akimenko</i>	
<b>INDEXES OBJECTIVELY REFLECTING PERFORMANCE EVALUATION OF TECHNICAL RUBBER GOODS</b> .....	694
<i>N. V. Vakulov, A. V. Myshlyavtsev, A. V. Zubarev, A. U. Kondyurin, V. I. Malyutin</i>	
<b>INVESTIGATION OF STRUCTURAL CHANGES IN MWCNT CAUSED BY ION IRRADIATION AND THERMAL ANNEALING</b> .....	701
<i>V. V. Bolotov, V. E. Kan, E. V. Knyazev</i>	
<b>SYNTHESIS OF THE ‘CARBON NANOTUBES-POROUS SILICON’ HYBRID MATERIAL FOR GAS SENSORS</b> .....	706
<i>V. E. Kan, V. V. Bolotov, K. E. Ivlev, E. V. Knyazev, V. E. Roslikov</i>	
<b>MECHANICAL FRACTURE OF VANADIUM DIOXIDE DURING THERMAL CYCLING</b> .....	711
<i>Vadim I. Surikov, Valery I. Surikov, N.A. Semenyuk, O. V. Lyah, Yu. V. Kuznetsova</i>	
<b>INCREASE OF RELIABILITY AND DURABILITY OF SHAFT PACKING-OFF OF OIL-TRANSFER PULSER OF THE MAIN OIL PIPELINES</b> .....	715
<i>Yu. K. Mashkov, A. A. Gladenko, N. A. Prokudina</i>	
<b>SOME CHANGES IN THE PROPERTIES OF NANODISPERSED CARBON BLACK PARTICLES UPON THEIR MODIFICATION</b> .....	720
<i>Yu. V. Surovikin, A. G. Shaitanov, A. V. Syrieva, I. V. Rezanov, I. V. Muromtsev</i>	
<b>THE STUDY OF THE ELECTRICAL STEEL AND AMORPHOUS FERROMAGNETS MAGNETIC PROPERTIES</b> .....	727
<i>A. S. Tatevosyan, A. A. Tatevosyan, N. V. Zaharova</i>	
<b>MECHANICAL STRENGTH OF COMPOSITE SUPPORTS FOR CATALYSTS BASED ON <math>\gamma</math>-AL<sub>2</sub>O<sub>3</sub> AND MORDENITE</b> .....	735
<i>E. A. Belopukhov, A. S. Belyi</i>	
<b>OBTAINING OF ULTRADISPERSED CADMIUM SULFIDE IN A BIOPOLYMER MATRIX</b> .....	742
<i>E. G. Shubenkova, M. V. Trenikhin, L. V. Slunkova</i>	
<b>SYNTHESIS OF CARBON MATERIALS BY THE SHORT-TERM MECHANOCHEMICAL ACTIVATION OF POLYVINYL CHLORIDE</b> .....	747
<i>V. S. Solodovichenko, V. A. Polyboyarov, A. A. Zhdanok, A. B. Arbutov, E. S. Zapevalova, Yu. G. Kryazhev, V. A. Likhobolov</i>	
<b>Author Index</b>	