

32nd International Conference on Metallurgy and Materials (METAL 2023)

Brno, Czech Republic
17-19 May 2023

ISBN: 979-8-3313-1243-5

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© (2024) by Tanger Ltd
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact Tanger Ltd
at the address below.

Tanger Ltd
Keltickova 62
710 00 Slezka Ostrava
Czech Republic

www.tanger.cz

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
Web: www.proceedings.com

SESSION A - ADVANCED IRON, CAST IRON AND STEELMAKING

HOT METAL DESULFURIZATION PROCESS AS AN OBJECT OF PHYSICAL AND MATHEMATICAL MODELLING	13
Angelika PODOLSKA, Jan FALKUS	
APPLICATIONS OF SMALL PUNCH TEST	20
Jan KANDER, Ladislav KANDER, Petr ČÍZEK, Petr JONŠTA	
ELECTRIC ARC FURNACE DUST: CHARACTERIZATION OF FLOWABILITY	26
Christof LANZERSTORFER, Christian BRUNNER	
LADLE MELT TREATMENT OF HIGH SULFUR STAINLESS STEELS	33
Jaka BURJA	
INFLUENCE OF BISMUTH IMPURITY ON THE SOLIDIFICATION KINETIC AND MICROSTRUCTURE OF Gd-CONTAINING Al-7Si-0.3Mg CAST ALLOYS	38
Ozen GURSOY, Giulio TIMELLI	
THE COMPARISON OF STEEL FLOW IN SIX STRAND TUNDISH USING THREE DIFFERENT TYPES OF IMPACT PADS	45
Peter DEMETER, Branislav BUĽKO, Róbert DZURŇÁK, Ivan PRIESOL, Slavomír HUBATKA, Lukáš FOGARAŠ, Jaroslav DEMETER, Martina HRUBOVČÁKOVÁ	
INVESTIGATION OF OPTIMAL TRANSIENT CONDITIONS IN T-SHAPE TUNDISH DURING STEEL INTERMIXING.....	52
Lukáš FOGARAŠ, Branislav BUĽKO, Peter DEMETER, Slavomír HUBATKA, Jaroslav DEMETER, Peter ŠMIGURA, Martina HRUBOVČÁKOVÁ	
THE VARIOUS WAYS INJECTION OF Y ₂ O ₃ PARTICLES INTO THE NICKEL-FREE STAINLESS-STEEL MELT BY EXPERIMENTAL VACCUM INDUCTION MELTING	59
Fedor POPOV, Alexandr PANICHKIN, Nikita LUTCHENKO, Askhat BELDEUBAYEV, Ivan SAMOKHVALOV, Alexandr ARBUZ	
IMPACT OF Al ₂ O ₃ /SiO ₂ ON THE SLAG SYSTEM IN THE COKE BED ZONE DURING HIGH CARBON FERROMANGANESE PRODUCTION USING BASIC MANGANESE ORES.....	64
Michel Kalenga WA KALENGA, Didier Kasongo NYEMBWE	
FEATURES OF THE PROCESS OF OBTAINING FERROVANADIUM UNDER CONDITIONS OF ELECTROSLAG MELTING	69
Yuriii KOSTETSKYI, Ganna POLISHKO, Yevhen PEDCHENKO, Volodymyr PETRENKO, Volodymyr ZAITSEV	
REFRACTORY LINING WEAR MECHANISM IN BASIC OXYGEN FURNACE	78
Jaroslav DEMETER, Branislav BUĽKO, Peter DEMETER, Slavomír HUBATKA, Lukáš FOGARAŠ, Martina HRUBOVČÁKOVÁ	
EFFECT OF CHEMICAL COMPOSITION OF SILICA SAND ON THERMAL DILATATION	84
Martina BAŠTÓVÁ, Petr LICHÝ, Miroslav DOSTÁL	
THE ADVANTAGES OF APPLICATION OF THE SPHERIC IMPACT PAD MADE FROM THE ADVANCED MATERIAL FOR THIS APPLICATION	89
Branislav BUĽKO, Peter DEMETER, Ivan PRIESOL Slavomír HUBATKA, Lukáš FOGARAŠ, Jaroslav DEMETER, Martina HRUBOVČÁKOVÁ	

STUDY OF ZINC AND LEAD THERMAL REDUCTION FROM A STEELMAKING SLUDGE.....	95
Vladislav KURKA, Petr JONŠTA, Ladislav KANDER, Roman NOGA, Ondřej KOTÁSEK	
THE PROCESSING OF EXPERIMENTAL DATA FROM THE PHYSICAL MODEL OF A FDU REFINING UNIT	101
Jan KOLÍNSKÝ, Tomáš PRÁŠIL, Ladislav SOCHA, Karel GRYC, Jana SVIŽELOVÁ, Martin DVOŘÁK, Petr NUSKA	
SELECTED DESIGN PARAMETERS OF BALING PRESSES FOR THE TREATMENT OF STEEL SCRAP AS A CHARGE FOR STEELMAKING FURNACES	108
Ladislav KOVÁŘ, Eliška NOVÁKOVÁ, Vít KOSTECKÝ, Štěpán PRAVDA, Radim ŠEBESTA	
INTRODUCTION TO THE METHODOLOGY OF THE STUDY OF OPERATIONAL WEAR OF EXPERIMENTAL SHAPED PARTS OF MOULDS FOR HPDC OF ZINC ALLOYS	114
Kamil KOZA, Karel GRYC, Ladislav SOCHA, Martin PINTA, Roman KUBEŠ, Václav SOCHACKÝ, Adnan MOHAMED, Jaromír TROBL	
BREAKAGES OF SØDERBERG ELECTRODES DURING SUBMERGED ARC FURNACES START-UP	121
Sławomir KOZŁOWSKI, Konrad KOŁTUN, Katarzyna JANIK, Łukasz BANASIK	
INFLUENCE OF THE ACTIVE SURFACE OF THE PURGING PLUG ON THE EFFECTIVENESS OF THE ARGON BLOWING PROCESS IN THE LADLE	126
Tomasz MERDER, Jacek PIEPRZYCA, Mariola SATERNUS, Robert WENDE	
THE EFFECT OF SPHEROIDAL GRAPHITE ON FRACTURE PROCESS INITIATION IN CAST IRON	132
Martin NEVŘELA, Michal WEISZ, Petr SEHNOUTKA, Marek BESEDA	
THE POSSIBILITIES OF STUDYING THE LIFETIME OF ADDITIVELY MANUFACTURED SHAPED MOLD PARTS	138
Martin PINTA, Ladislav SOCHA, Karel GRYC, Jana SVIŽELOVÁ, Adnan MOHAMED, Martin DVOŘÁK, Miloslav ROH	
EFFECT OF HEAT TREATMENT ON THERMAL CONDUCTIVITY OF ADDITIVELY MANUFACTURED AISI H13 TOOL STEEL	146
Samo TOME, Blaž KARPE, Irena PAULIN, Matjaž GODEC	
DESIGNING OF NUMERICAL MODEL APPLICATION TO PREDICT FINAL HYDROGEN CONTENT AT END OF VACUUM DEGASSING TREATMENT	151
Miroslav DOSTÁL	
SESSION B - METAL FORMING	
DETERMINATION OF THE CRITICAL STRAIN FOR GRAIN COARSENING DURING HOT ROLLING	158
Richard FABÍK, Marcel JANOŠEC, Ivo SCHINDLER, Michal SAUER	
EXPERIMENTAL AND NUMERICAL INVESTIGATION OF DYNAMIC TRANSFORMATION INDUCED PLASTICITY DURING HOT FORMING	164
Bernd-Arno BEHRENS, Johanna UHE, Hendrik WESTER, Christoph KOCK, Norman HEIMES	
DEFORMATION-INDUCED STRENGTH INCREASE IN A FUNCTIONAL SURFACE OF ANGULAR BALL BEARING RINGS MADE OF X5CrNi18-10 (AISI 304).....	170
Michael TILL, Sebastian KUHLMANN, Julius PEDDINGHAUS, Hendrik WESTER, Daniel ROSENBUSCH, Bernd-Arno BEHRENS	

INFLUENCING THE MECHANICAL PROPERTIES OF PRE-JOINED HYBRID SEMI-FINISHED PRODUCTS BY IMPACT EXTRUSION.....	175
Armin PIWEK, Julius PEDDINGHAUS, Johanna UHE, Kai BRUNOTTE	
EFFECT OF OXIDE DISPERSION ON ELECTRIC CONDUCTIVITY OF ROTARY SWAGED POWDER-BASED COPPER COMPOSITES	181
Lenka KUNČICKÁ, Marek BENČ, Petr KAČOR, Martin MAREK	
INFLUENCE OF DEFORMATION TEMPERATURE AND STRAIN RATE ON THE MAXIMUM FLOW STRESS LEVEL OF THE 3D PRINTED AISI 316L STEEL	188
Marek BENČ, Petr OPĚLA	
DETERMINATION OF THE DEPENDENCE OF THE TOTAL DRAWING FORCE ON THE DIE APROACH ANGLE, PARTIAL STRAIN AND FRICTION DURING DRAWING OF STEEL WIRE.....	188
Richard FABÍK, Svatopluk ČECH	
FEM-SIMULATION OF TRANSVERSE DEFECT CLOSURE IN AUSTENITIC STAINLESS STEEL BY RADIAL SHEAR ROLLING	198
Alexandr ARBUZ, Anna KAWALEK, Fedor POPOV, Nikita LUTCHENKO, Ivan SAMOKHVALOV, Evgeniy PANIN	
INFLUENCE OF INDIVIDUAL FACTORS ON THE RESULTS OF THE CYLINDRICAL CUP DRAWING TEST	202
Radek ČADA, Antonín HIKADE	
EFFECT OF AUSTENITIZING TEMPERATURE ON THE PHASE TRANSFORMATIONS OF Mn-Cr-Mo PIPE STEEL.....	208
Svatopluk ČECH, Ivo SCHINDLER, Rostislav TUROŇ, Tomáš MERVA, Michal KONDERLA	
DCCT DIAGRAM OF A CASE-HARDENING STEEL 20MnCr55	213
Michal KONDERLA, Ivo SCHINDLER, Zdeněk SOLOWSKI, Tomáš MERVA, Svatopluk ČECH	
LASER FORMING IN THE USE OF HELICAL METAL EXPANSION JOINTS MANUFACTURING.....	219
Piotr KURP	
FEM-SIMULATION ANALYSIS OF SPHERICAL CAVITY ECAP DESIGN AT DIFFERENT CHANNEL ANGLES	223
Nikita LUTCHENKO, Alexandr ARBUZ, Fedor POPOV, Ivan SAMOKHVALOV	
INFLUENCE OF SIMPLIFICATION OF THERMOPHYSICAL PROPERTIES ON COMPUTATIONAL MODELING OF HEATING PROCESS OF STEEL BILLETS IN PUSHER-TYPE REHEATING FURNACE	228
Mario MACHŮ, David RIGO, René PYSZKO, Yesudass ARASAPPAN	
EFFECT OF TEMPERATURE ON MATERIAL BEHAVIOUR IN THE TENSILE TEST	234
Jiří MARYT, Vít NOVÁK, František TATÍČEK, Michal VALEŠ, Ondřej STEJSKAL	
DESIGN OF FORMING TOOLS FOR A LOCK COVER PART USING THE FFF 3D PRINTING METHOD	240
Vít NOVÁK, František TATÍČEK, Ondřej STEJSKAL, Jan ŠANOVEC, Josef HEJNIC	
EXPERIMENTAL ANALYSIS OF CRACK FORMATION AT SHEET METAL EDGES.....	247
Jan PETR, Vít NOVÁK, František TATÍČEK, Stanislav RUSZ, Jan HAVELK	
TRIBOLOGY IN SHEET METAL FORMING: A MODIFICATION OF TRIBOMETER FOR STRIP DRAWING TEST	252
Ondřej STEJSKAL, František TATÍČEK, Vít NOVÁK, Jiří MARYT, Josef HEJNIC, Jan PETR, Jan HAVELK	

TECHNOLOGY AND EXPERIMENTAL RESULTS OF METAL EXPANSION JOINTS FABRICATION	258
Szymon TOFIL, Piotr KURP, Hubert DANIELEWSKI, Bartłomiej SZWED	
DESIGN, PROCESSING AND PROPERTIES OF PRECIPITATION-HARDENABLE COMPLEX CONCENTRATED ALLOY.....	263
Kateryna ULYBKINA, Juraj LAPIN, Kateryna KAMYSHNYKOVA	
SESSION C - STEEL PRODUCTS - PROPERTIES	
APPLICABILITY OF NDT METHODS FOR THE DETECTION OF TYPICAL DEFECTS IN SELECTIVE LASER MELTING PARTS	271
Alexey MOSKOVCHENKO, Michal ŠVANTNER, Šárka HOUDKOVÁ	
INVESTIGATING THE HOT WORKING WINDOW OF 2205 DSS USING DYNAMIC MATERIAL MODEL.....	277
Elvis GONYA, Charles SIYASIYA, Elizabeth MAKHATHA	
HYDROGEN IMPACT ON FRACTURE PROPERTIES OF 34crMo4 PRESSURE CYLINDER STEEL	283
Marek DOBIÁŠ, Petr ČÍZEK, Ladislav KANDER, Petr JONŠTA	
APPLICATION OF FINITE ELEMENT METHOD FOR LOW CYCLE FATIGUE ANALYSIS FOR STEEL	289
Sushant B PATE, Gintautas DUNDULIS, Albertas GRYBENAS	
ANALYSIS OF VIBRATION MODES OF SEMI-TRAILER AXLE AND THEIR EFFECTS ON FATIGUE LIFE	296
Kazimierz DROZD, Jonas MATIJOŠIUS, Iryna BORETSKA	
MICROSTRUCTURE MODIFICATIONS OF Al-Si-COATED PRESS-HARDENED STEEL 22MnB5 BY LASER WELDING.....	302
Hana ŠEBESTOVÁ, Petr HORNÍK, Filip MIKA, Šárka MIKMEKOVÁ, Ondřej AMBROŽ, Libor MRŇA	
ENHANCING DUCTILITY OF HOT-WORK TOOL STEEL THROUGH ISOTHERMAL BAINITIC TRANSFORMATION	308
Anže BAJŽELJ, Aleš NAGODE, Tilen BALAŠKO, Barbara ŠETINA BATIČ, Jaka BURJA	
LASER WELDING OF SIMILAR AND DISIMILAR LAP JOINT - PROCESS ANALYSIS.....	315
Hubert DANIELEWSKI, Andrzej SKRZYPCKI	
INFLUENCE OF SILICON AND MOLYBDENUM ON STRENGTH AND PLASTICITY OF 0.1C STEEL SHEET	321
Jaromír DLOUHÝ	
METHODOLOGY FOR INVESTIGATION OF CREEP PROPERTIES USING SUB-SIZE SPECIMEN	327
Eva CHVOSTOVÁ, Pavel KONOPÍK	
PREDICTION OF QUENCHED AND TEMPERED STEEL HARDNESS USING CARBON EQUIVALENT (CE)	333
Dario ILJKIĆ, Sunčana SMOKVINA HANZA, Božo SMOLJAN, Dario KVRCIĆ	
SELECTION OF DUPLEX STEEL WELDING PROCESS USING LOW CYCLE FATIGUE TEST	340
Remigijus JANULIONIS, Albertas GRYBENAS, Vidas MAKAREVIČIUS, Aleksandra LEGHA, Vaidas LIESIONIS	
CHANGES IN DEVELOPMENT OF PROTECTIVE PATINA ON WEATHERING STEEL.....	346
Kateřina KREISLOVÁ, Markéta VLACHOVÁ, Anna PÍŠKOVÁ, Pavlína FIALOVÁ, Petr POKORNÝ, Vít KŘIVÝ, Miroslav VACEK	
THE FAILURE ANALYSIS OF A PIPELINE BEND MADE OF 16Mo3 STEEL.....	352
Zdeněk KUBOŇ, Jana KOSNOVSKÁ, Gabriela ROŽNOVSKÁ	

VERIFICATION OF THE EMISSIVITY VALUE OF SELECTED REFERENCE PAINTS FOR NON-CONTACT TEMPERATURE MEASUREMENT	359
Tomáš NĚMEC, Marie KOLAŘÍKOVÁ, Ladislav KOLAŘÍK, Jan SOVA	
EFFECT OF STEEL COMPOSITION ON ITS BEHAVIOUR IN THE LIQUID LEAD ENVIRONMENT	364
Martina PAZDEROVÁ, Anna HOJNÁ, Jan VÍT, Hynek HADRABA, Jan ČÍZEK	
SESSION D - MODERN TRENDS IN SURFACE ENGINEERING	
COLD SPRAY ADDITIVE MANUFACTURING.....	370
Ondřej CHOCHOLATÝ, Lucie JAROLÍMOVÁ, Karel LIŠKA, Marek VOSTŘÁK, Šárka HOUDKOVÁ	
EFFECT OF ANTI-CORROSION PROTECTIVE PAINT ON THERMOGRAPHIC INSPECTION OF CURVED STEEL TUBE PARTS.....	375
Michal ŠVANTNER, Alexey MOSKOVCHENKO, Lukáš MUZIKA	
INFLUENCE OF DEFORMATION ON THE COATING PROPERTIES OF AIRCRAFT FUSELAGE SHELLS.....	380
Jan JEPKENS, Norman HEIMES, Hendrik WESTER, Philipp MÜLLER, Sven HÜBNER, Simon WEHRMANN, Matthias MÜLLER, Bernd-Arno BEHRENS	
EFFECT OF PRECURSOR CONCENTRATION IN THE REACTION MIXTURE ON THE MORPHOLOGY AND CORROSION BEHAVIOUR OF MgAl-LDH COATINGS ON AZ31 MAGNESIUM ALLOY	386
Lenka HORÁKOVÁ, Leoš DOSKOČIL, Jaromír WASSERBAUER, Matěj BŘEZINA, Martin BUCHTÍK	
TRIBOLOGICAL ANALYSIS OF GEOPOLYMERS COATED WITH MODIFIED EPOXY COATINGS AND AFTER PLASMA TREATMENT.....	392
Vojtěch RŮŽEK, Michal KRAFKA, Totka BAKALOVA, Martina RYVOLOVÁ	
EFFECT OF GLYCEROL-2-PHOSPHATE AND EDTA ON THE PREPARATION OF CAP COATING ON AZ31 MAGNESIUM ALLOY UNDER NEUTRAL pH CONDITION	402
Leoš DOSKOČIL, Tomáš HORÁK, Jaromír WASSERBAUER, Petr WOLANSKÝ, Martin BUCHTÍK	
CORROSION BEHAVIOUR OF AZ31 ALLOY IN AN ALKALINE ENVIRONMENT OF 0.1 M NaCl IN THE PRESENCE OF LIGNITIC HUMIC ACID	408
Tomáš HORÁK, Martin BUCHTÍK, Jaromír WASSERBAUER, Matěj BŘEZINA, Leoš DOSKOČIL	
DETERMINATION OF LIQUID METAL EMBRITTLEMENT AFTER RESISTANCE SPOT WELDING OF ZN-COATED HIGH-STRENGTH STEELS.....	413
Mehtap HIDIROĞLU, Tanya A. BAŞER	
EFFECT OF CITRIC ACID AS A CHELATING AGENT ON THE MICROSTRUCTURE AND COMPOSITION OF HYDROTHERMALLY-PREPARED CAP COATINGS ON AZ31 MAGNESIUM ALLOY	420
Lenka HORÁKOVÁ, Jaromír WASSERBAUER, Leoš DOSKOČIL, Matěj BŘEZINA, Martin BUCHTÍK	
ADVANTAGES OF GLOW DISCHARGE OPTICAL EMISSION SPECTROMETRY (GDOES) IN THE ANALYSIS OF DIFFERENT TYPES OF ZINC COATINGS ON STEEL	426
Jiřina VONTOROVÁ, Jitka PODJUKLOVÁ, Petr MOHYLA, Klára KURSOVÁ, Karolina SLAMOVÁ	
TESTS FOR APPLYING COATINGS BASED ON ALUMINUM AND SILVER ON ALNICO ALLOYS.....	433
Damian BAŃKOWSKI, Piotr MŁYNARCZYK, Bartłomiej SZWED, Joanna KOWALCZYK	

INFLUENCE OF BALL MATERIAL ON THE RESULTING FATIGUE LIFE OF THERMAL SPRAYED HVOF COATINGS IN DYNAMIC IMPACT TESTING	439
Josef DULIŠKOVIČ, Josef DANIEL, Šárka HOUDKOVÁ	
ANALYSIS OF THE POSSIBILITY OF APPLYING THE MACHINE LEARNING METHODS FOR THE PREDICTION THE SURFACE GEOMETRY AFTER ITS TECHNOLOGICAL TREATMENT.....	445
Aneta GĄDEK-MOSZCZAK, Dominik NOWAKOWSKI, Paweł LEMPA	
THE INFLUENCE OF THE USE OF DLC COATING ON THE SURFACE OF THE TURBOCHARGER SLIDE BEARING ON ITS OPERATING PARAMETERS.....	449
Damian HADRYŚ, Wioletta CEBULSKA, Marek JASIOK	
INFLUENCE OF STAND-OFF DISTANCE ON THE QUALITY OF STAINLESS STEEL COATINGS FORMED BY COLD SPRAY	455
Lucie JAROLÍMOVÁ, Jana NAĎOVÁ, Šárka HOUDKOVÁ	
EFFECT OF HIGH-ENERGY Xe ION IMPLANTATION ON TRIBOLOGICAL PROPERTIES OF CHROMIUM UNDER WET CONDITIONS	461
Mariusz KAMIŃSKI, Piotr BUDZYŃSKI, Mirosław SZALA, Zbigniew SUROWIEC, Maxim ZDOROVETS, Artem KOZLOVSKYI	
MECHANICAL PROPERTIES OF LASER CLEANING SURFACE, USED FOR BONDING JOINT OF ALUMINIUM METAL SHEET EN AW 5754	467
Marek BESEDA, Miroslav SUCHÁNEK, Petr SEHNOUTKA, Filip HUVAR, Michal WEISZ, Pavel KLAUS	
FUNCTIONAL TUNGSTEN-BASED THIN FILMS AND THEIR CHARACTERIZATION.....	473
Zuzana KOŠELOVÁ, Lenka HORÁKOVÁ, Dinara SOBOLA, Daniel BURDA, Alexandr KNÁPEK, Zdenka FOHLOROVÁ	
CASE STUDY OF DEFECTS ON VITREOUS ENAMEL COATING	480
Kateřina KREISLOVÁ, Markéta VLACHOVÁ, Hana GEIPLOVÁ	
METALOGRAPHIC ANALYSIS OF DURABLE LAYERS MADE BY LASER CLADDING FOR EXPOSED PARTS.....	486
Petr MARTÍNEK, David HRADIL, Karel BROM	
COMPARISON OF ABRASIVE WEAR RESISTANCE OF ARC-SPRAYED AND HVOF-SPRAYED COATINGS AS WELL AS OVERLAY WELDS MADE USING SELF-SHIELDED FLUX-CORED WIRE	492
Michał SZYMURA, Vladislav OCHODEK	
TECHNOLOGY AND APPLICATIONS OF ESD COATINGS BEFORE AND AFTER LASER PROCESSING	500
Norbert RADEK, Jacek PIETRASZEK, Artur KALINOWSKI, Łukasz J. ORMAN, Marcin SZCZEPANIAK, Jacek ŚWIDERSKI, Agata DUDEK	
PREPARATION OF Mg-Al LDH COATING ON AZ31 MAGNESIUM ALLOY UNDER MILD CONDITIONS	506
Pavlína ŠOMANOVÁ, Martin BUCHTÍK, Jaromír WASSERBAUER, Leoš DOSKOČIL	
PREPARATION OF PEO COATINGS ON AZ31 MAGNESIUM ALLOY IN THE PRESENCE OF HUMIC ACID	512
Leoš DOSKOČIL, Pavlína ŠOMANOVÁ, Jaromír WASSERBAUER, Daniel KAJÁNEK, Martin BUCHTÍK	
EVALUATION OF MECHANICAL AND TRIBOLOGICAL PROPERTIES OF HARDMETAL COATINGS DEPOSITED BY HVOF THERMAL SPRAYING METHOD.....	517
Tomáš TARANDA, Žaneta DLOUHÁ, Jana NAĎOVÁ, Šárka HOUDKOVÁ	

FUTURE OF DEVELOPMENT OF MODERN TRENDS IN SURFACE ENGINEERING	523
Jan VANĚK, Jitka PODJUKLOVÁ, Pavel DOSTÁL, Svatopluk SLOVÁK	
ENHANCEMENT OF SURFACE PROPERTIES AND WEAR RESISTANCE OF DIRECT METAL LASER SINTERED STAINLESS STEEL 17-4PH.....	527
Mariusz WALCZAK, Aleksander ŚWIETLICKI, Mirosław SZALA	
SESSION E - NON-FERROUS METALS AND ALLOYS	
EFFECT OF SOLIDIFICATION CONDITIONS ON THE MICROSTRUCTURE OF MULTIPHASE	
Al _{0.4} CoCr _{1.3} FeNi _{1.3} (Si, Ti, C, B) _{0.4} COMPLEX CONCENTRATED ALLOY	534
Alena KLIMOVÁ, Juraj LAPIN	
MECHANICAL PROPERTIES OF AISI10Mg PLATES PRODUCED BY SELECTIVE LASER MELTING WITH DISSIMILAR AUTOMOTIVE ALUMINUM ALLOYS BY FRICTION STIR WELDING	540
Mehtap HIDIROĞLU, Tanya A. BAŞER, Melis TÜRKSEVER	
INFLUENCE OF THE ENRICHMENT OF NATURAL GAS WITH HYDROGEN ON THE HYDROGEN SOLUBILITY OF DIFFERENT COPPER QUALITIES AND THE HEAT BALANCE	549
Lars FELKL, Olaf SCHWEDLER, Alexandros CHARITOS	
HYDROMETALLURGICAL ZINC PRODUCTION - ENVIRONMENTAL AND EXERGY ANALYSIS	555
Georgi PATRONOV	
RECYCLING OF PRINTED CIRCUIT BOARDS BY ACID LEACHING	561
Magdalena LISIŃSKA, Mariola SATERNUS	
ALUMINOTHERMIC PROCESS FOR GERMANIUM RECOVERY USING FAYALITE COPPER SLAG	567
Ezekiel Ngoy Kiboko KALALA, Michel Kalenga WA KALENGA	
PREPARATION OF NiAl-FeSi COMPOSITES BY POWDER METALLURGY	573
Pavel NOVÁK, Stanislav MESTEK, Alena MICHALCOVÁ, Kateřina SKOTNICOVÁ, Ivo SZURMAN	
MINOR PHASES IN TIN-RICH HISTORICAL MATERIALS.....	579
Alena MICHALCOVA, Sarka MSALLAMOVA, Dominika FINK, Martin FRIAK	
SYNTHESIS AND THERMOELECTRIC PROPERTIES OF SnSe BASED ALLOYS	583
František MIHOK, Karel SAKSL	
INVESTIGATION ON A POSSIBLE REVIEW ON THE THERMODYNAMIC PREDICTIONS ON THE CARBON SOLUBILITY IN Mn-Fe MELT DURING CARBOTHERMIC REDUCTION USING NCHWANENG MANGANESE ORES	590
Michel Kalenga WA KALENGA	
THE INVESTIGATION OF ALLOY 800H DEGRADATION IN CONDITIONS SIMULATING HELIUM COOLANT IN HTGR SYSTEM	596
Tereza BARTÍKOVÁ, Jan PROCHÁZKA, Jan BERKA	
CHARACTERISTICS OF THE SEIZURE PROCESSOF AIR COMPRESSOR PISTONS OF AUTOMOTIVE VEHICLES	602
Wioletta CEBULSKA, Damian HADRYŚ	

DETERMINATION OF A SUITABLE HEAT TREATMENT METHOD FOR THE TITANIUM ALLOY Ti-6Al-4V ENDOPROSTHESIS SHANK.....	609
Radek ČADA, Tomáš PEKTOR	
RECYCLING OF THE TITANIUM SCRAP BY USING OF PLASMA METALLURGY	615
Jaromír DRÁPALA, Jiří REŽNAR, Daniel PETLÁK, Martin HALFAR, Jan KRČIL, Vladimír MÁRA	
ALUMINUM CASTING TECHNOLOGY MANAGEMENT ANALYSIS.....	622
Andrzej PACANA, Karolina CZEŘWIŃSKA, Renata DWORNICKA	
DEVELOPMENT OF METHODOLOGY FOR MULTIAXIAL DYNAMIC TESTING OF MATERIALS FOR AUTOMOTIVE CONSTRUCTION GROUPS.....	629
Petr FOJTÍK, Petra VÁŇOVÁ	
THE INFLUENCE OF THE THERMAL TREATMENT ON THE MICROSTRUCTURE AND FRACTURE FEATURES OF NiTi ALLOY.....	635
Michal KOPELENT, Monika LOSERTOVÁ, Bogusława ADAMCZYK-CIEŚLAK, Kateřina KONEČNÁ, Dalibor MATÝSEK, Tomáš HALO, Kristýna KLIMKOVÁ	
RECYCLABLE MULTIMETALLIC HIGH TEMPERATURE MATERIALS FOR ENERGY APPLICATIONS.....	641
Adéla MACHÁČKOVÁ, Silvie BROŽOVÁ, Petra VÁŇOVÁ, Aleš SLÍVA, Kateřina KONEČNÁ, Grazyna SIMHA MARTYNKOVÁ	
KINETICS OF THE REAGENT OXIDATION OF MOLYBDENUM DISULFIDE BY NITRIC ACID	647
Sitorabonu RASULOVA, Vitaliy GURO, Matluba IBRAGIMOVA, Firuza RAKHMATKARIYeva, Khayitali ADINAEV, Umid ERNAZAROV, Gayrat PARMONOV, Zokhidjon RAKHIMJONOV	
PROCESSING OF CAKE OF MOLYBDENUM MINING AND METALLURGICAL PRODUCTION BY ELECTROOXIDATION IN CHLORIDE-CONTAINING SOLUTIONS	654
Sitorabonu RASULOVA, Vitaliy GURO, Mavluda IBRAGIMOVA, Khayitali ADINAEV, Jakhongir KURBANOV, Edgorjon SAFAROV, Feruza FUZAYLOVA, Otobek PARDAEV	
CORROSION BEHAVIOR OF NICKEL-BASE ALLOYS IN HIGH-TEMPERATURE GAS ENVIRONMENTS FOR CCS TECHNOLOGIES.....	661
Jana REJKOVÁ, Daniela MARUŠÁKOVÁ	
CORROSION OF METALS OF ORGAN PIPES IN VOLATILE ORGANIC COMPOUNDS ENVIRONMENT	667
Kristýna Charlotte STRACHOTOVÁ, Milan KOUŘIL, Šárka MSALLAMOVÁ	
HIGH TEMPERATURE OXIDATION OF EN AW 7075 ALUMINIUM ALLOY	673
Nejc VELIKAJNE, Tilen BALAŠKO, Jaka BURJA, Matjaž GODEC, Irena PAULIN	
SESSION F - ECONOMICS AND MANAGEMENT OF METALLURGICAL PRODUCTION	
USE OF UNIT LOAD AGVS FOR FULLY AUTOMATED PART HANDLING IN THE WELDING SHOP	680
Jiří ZÁRUBA, Radim LENORT	
EDUCATIONAL MODEL TO INCREASE KNOWLEDGE OF AGILITY IN METAL INDUSTRIAL COMPANIES FOR PROJECT PORTFOLIO MANAGEMENT	685
Pavel KOLOŠ, Adam PAWLICZEK, Štefan KOLUMBER	

ARTIFICIAL INTELLIGENCE AS A METHOD OF OPTIMIZING RISKS AND COSTS IN THE PROCUREMENT OF HIGH-TECH METALLURGICAL PRODUCTS	690
Pavel DOHNAL, Pavel DOHNAL Jr., Dmitry KAZANTSEV	
PRO-QUALITY METHOD IMPROVING INDUSTRIAL PRODUCTS TOWARD SUSTAINABLE DEVELOPMENT WITH CRITERIA OF CIRCULAR ECONOMY.....	697
Andrzej PACANA, Dominika SIWIEC, Renata DWORNICKA	
DIGITALISATION-BASED OPTIMIZATION OF STEEL PRODUCTION FOR COMPETITIVENESS AND SUSTAINABILITY.....	703
Slavomír HUBATKA, Branislav BUĽKO, Dana BARICOVÁ, Peter DEMETER, Lukáš FOGARAŠ, Jaroslav DEMETER, Martina HRUBOVČÁKOVÁ	
THE IMPACT OF ECONOMIC POLICY UNCERTAINTY ON THE ECONOMIC BENEFITS OF CHINA'S LISTED IRON AND STEEL ENTERPRISES	709
Radim LENORT, Wenlong YAO, Weixue HAN, Jingjing DUAN	