

# Table of Contents

## Preface

## I. Materials Analysis

|   |    |
|---|----|
| <b>Microstructure and Properties of Ti-47Al-2W-0.5Si Cast Alloy</b>   | 3  |
| A. Szkliniarz and W. Szkliniarz   |    |
| <b>Determination of Nickel in Welding Fume by Gravimetric Method Using Dimethylglyoxime</b>   | 7  |
| J. Matusiak and A. Wycislik   |    |
| <b>Estimation of Carbon Balance in Reaction Zones of a Submerged-Arc Furnace during Ferrosilicon Smelting</b>   | 11 |
| B. Machulec and G. Kopeć  |    |
| <b>The Origin of the Ferroelectricity in the Bismuth Titanate <math>\text{Bi}_4\text{Ti}_3\text{O}_{12}</math> with Perovskite-Like Layered Structure</b> | 17 |
| J.A. Bartkowska, J. Dercz and D. Michalik   |    |
| <b>Thermal Stability of Ti-6Al-4V Alloy with Carbon Content</b>   | 23 |
| A. Szkliniarz   |    |
| <b>Biomechanical Analysis of Selected Endoprostheses of Hip Joint by Means of Finite Element Methods</b>  | 29 |
| M. Basiaga and J. Przondziona   |    |
| <b>Effect of Heat Treatment on the Microstructure and Mechanical Properties of Sintered Stainless Tool Steel</b>  | 33 |
| K.J. Ducki, J. Jasiewicz, G. Junak and L. Wojtynek  |    |
| <b>The Influence of Addition of the Rare Earth Elements on the Structure and Hardness of AlZn12Mg3.5Cu2.5 Alloy</b>                                       | 39 |
| R. Michalik and T. Mikuszewski  |    |
| <b>Effect of Autogenous Laser Weld on Microstructure and Mechanical Properties of Inconel 617 Nickel Alloy</b>  | 43 |
| J. Adamiec and R. Kocurek   |    |

## II. Processing Technologies

|   |    |
|---|----|
| <b>Strength-Energy and Structural Effects of Dynamic Deformation of Aluminum Alloy</b>  | 49 |
| A. Płachta, J. Pawlicki and K. Rodak  |    |
| <b>Influence of the Materials Combination for the Surface Temperature of the Bimetallic Wire Deformed in the Cold Drawing Process</b> | 53 |
| D. Halaczek and E. Hadasik  |    |
| <b>Preparation of <math>\text{SiC}_w</math>-ZTA Composites by Two-Step Sintering or Spark Plasma Sintering</b>                        | 59 |
| E. Czerska, W. Pyda, N. Moskała, A. Huczko and A. Dąbrowska   |    |
| <b>Tests of Welded Joints of New Generation Austenitic, Stainless Steel HR3C</b>  | 65 |
| S. Lalik  |    |
| <b>Fatigue Behaviour of Carbide Precipitation Hardened Austenitic Steels</b>  | 69 |
| K.J. Ducki, M. Cieśla, G. Junak and L. Wojtynek   |    |
| <b>Influence of the Thermo-Mechanical Treatment on the Properties and Microstructure of High Manganese Austenitic-Ferritic Steel</b>  | 75 |
| M. Jabłońska, D. Kuc, G. Niewielski and B. Chmiela  |    |
| <b>Durability of Tube Bends Made of the 14MoV6-3 Steel under Low-Cycle Fatigue Conditions and Creep at a Temperature of 500°C</b>     | 79 |
| M. Cieśla, R. Findziński and G. Junak   |    |
| <b>Cracking of 7CrMoVTiB10-10 (T24) Steel Weld Joints</b>   | 87 |
| M. Stopyra and J. Adamiec   |    |
| <b>The Influence of the Solutionizing and Ageing on the Structure and Hardness of the ZnAl40Cu3 Alloy</b>                             | 91 |
| R. Michalik and B. Chmiela  |    |

|   |     |
|---|-----|
| <b>Evaluation of Susceptibility to Hot Cracking of Inconel 617 Nickel Alloy Welds in Transvarestraint Test</b>  |     |
| R. Kocurek and J. Adamiec   | 95  |
| <b>Microstructure and Mechanical Properties of High Manganese TWIP Steel after Thermo-Forming Processes</b>     |     |
| M. Jabłońska, D. Kuc, K. Horzelska and A. Śmiglewicz  | 99  |
| <b>The Causes of Low Impact Strength of T23 Steel Weld Joints</b>   |     |
| J. Adamiec, I. Pikos and M. Stoprya   | 103 |
| <b>Welding Duplex Steel Type X2CrNiMoN25-7-4 with Analysis of Ferrite Content Measurements in Welded Joints</b> |     |
| S. Lalik and J. Gucwa   | 107 |
| <b>Usefulness of Quartzites for the Production of Ferrosilicon</b>  |     |
| G. Kopeć and R. Przeliorz   | 111 |
| <b>Porosity of Solid and Cored Turbine Blades of Aircraft Engines</b>   |     |
| S. Roskosz, J. Nawrocki and K. Kubiak   | 115 |

### **III. Surface Engineering**

|   |     |
|---|-----|
| <b>Laser Remelting of Silicide Coatings on Mo and TZM Alloy</b>   |     |
| G. Moskal, A. Grabowski and A. Lisiecki   | 121 |
| <b>Profilometric Assessment of Surface Condition of Zinc Coatings Formed by the Continuous Galvanizing Method</b> |     |
| J. Mendala and J. Wieczorek   | 127 |
| <b>The Influence of Si Content in Steel on Growth Kinetics and Structure of Hot Dip ZnAl23Si Coatings</b>         |     |
| H. Kania  | 133 |
| <b>High Temperature Cyclic Oxidation of Coatings on Ni-Based Superalloys</b>                                      |     |
| M. Kianicova and J. Trník   | 137 |
| <b>Zinc Coatings Obtained by Hot Dip Method on the High Strength Steel for Link Chains</b>                        |     |
| P. Liberski   | 143 |
| <b>The Influence of High Velocity Thermal Spraying Methods on Top Surface Topography of WC-Co Coatings</b>        |     |
| H. Myalska, J. Wieczorek, K. Szymański and G. Moskal  | 149 |
| <b>The Structure of Coatings Obtained in a ZnAl23Si Bath by the Batch Hot Dip Method</b>                          |     |
| H. Kania  | 155 |
| <b>Characteristics of Selected Tribological Properties of New Thermally Sprayed Coatings</b>                      |     |
| K. Szymański and B. Szczucka-Lasota   | 161 |
| <b>The Possibility of the LME Phenomenon in Elements Subjected to Metallization in Zn Bath with Bi Addition</b>   |     |
| J. Mendala  | 167 |
| <b>Zinc-Aluminum Coatings Obtained by Hot Dip Method on High Strength Steel for Link Chains</b>                   |     |
| P. Liberski and J. Mendala  | 173 |
| <b>A Study of Hot Corrosion Behaviour of NiAl Coatings in an Aggressive Environment</b>                           |     |
| M. Kianicová and J. Kafrik  | 177 |

### **IV. Materials and Environment**

|   |     |
|---|-----|
| <b>Client in the Center Metallurgical Enterprise Organization</b>   |     |
| B. Gajdzik and M. Kuczyńska-Chałada   | 185 |
| <b>Industrial Experiments Filtration of Steel</b>   |     |
| K. Janiszewski, B. Gajdzik, K. Gryc, L. Socha and A. Bogdał   | 189 |
| <b>Characteristics of the Structure and Corrosion Resistance of New Elaborated Coatings for Energy Industry</b> |     |
| B. Szczucka-Lasota and K. Szymański   | 193 |

|  |     |
|--|-----|
| <b>The Use of Trapezoidal Fuzzy Numbers in the Model to Optimize the Batch of Electric Arc Furnace</b>   |     |
| B. Machulec and A. Kuźnik  | 199 |
| <b>Strategic Investments of Restructured Metallurgical Companies in Sustainability Business</b>  |     |
| B. Gajdzik, K. Janiszewski and J. Szymszal   | 205 |
| <b>Thermal Analysis Results and the Theoretical Determination of Solidus and Liquidus Temperatures for the Grain Oriented Electrical Steel</b> |     |
| K. Gryc, B. Smetana, K. Janiszewski, M. Žaludová, M. Tkadlečková, L. Socha, K. Michalek and L. Válek   | 209 |
| <b>Analysis of the Possibilities Using of the Post-Reaction Gases Enthalpy from the Ferrosilicon Smelting Process</b>                          |     |
| W. Bialik and B. Machulec  | 215 |