

Table of Contents

Preface

Chapter 1: Plasma Nitriding of Stainless Steels

Effects of Gas Composition and Gas Pressure on Plasma Nitriding of Ferritic Stainless Steel Using 304 Stainless Steel Screen A. Nishimoto, O. Kishimoto and D. Tanaka	3
Active-Screen Plasma Nitriding of Small Thin Rolled Stainless Steel Plates K. Sumiya, S. Tokuyama, T. Aoki, J. Fukui, A. Nishiyama and A. Nishimoto	11
Effect of Solution Annealing and Plasma Nitriding on the Fatigue Life Change of AISI 304 Austenitic Steel M. Slezák, M. Uhrčík, V. Chvalníková, J. Belan and T. Vlach	19

Chapter 2: Surface Modification, Coatings and Corrosion Resistance

Influence of Thermal Treatments on the Corrosion Behaviour of Nickel-Aluminum Bronze in Freshwater-Like Aqueous Environment P. Linhardt, M.V. Biezma, S. Strobl and R. Haubner	29
New Approaches for Evaluating the Resistance of Clads under High Temperature Corrosion Conditions J. Brezinová, J. Viňáš and J. Brezina	37
Novel ASC Refractory Design and Installation for Improved Energy Efficiency and Corrosion Resistance in Industrial Applications A. Mašlejšová, D. Chudíková, B. Bul'ko, P. Demeter, J. Legemza, M. Hrubovčáková and L. Sobotova	45
The Impact of Final Turning on the SCC Susceptibility of Austenitic Stainless Steel AISI 304 and AISI 321 M. Kudláč, M. Dománková, K. Bártová, M. Gavalec and D. Slněk	51
Effects of Composition and Layer Number on the Mechanical Properties of Multilayered Si-DLC / DLC Coatings A. Okano and A. Nishimoto	59
Investigation of Al-Si Coating Behavior on 22MnB5 Boron Steel during Heat Treatment A. Ducháč and P. Kejzlar	67
Metallographic and Fractographic Analysis of Plastic Deformation of Austenitic Stainless Steel AISI 304 after Static and Dynamic Loading V. Chvalníková, M. Uhrčík, M. Slezák, J. Belan and T. Vlach	73
Metallographic Analysis of the Cutting Zone and Comparison with Numerical Simulation M. Martinkovič, M. Necpal, T. Vopát and M. Dománková	81

Chapter 3: Microstructure Evolution in Advanced Materials

Enhancement of Mechanical Properties in Al_{0.35}CoCrFeNi Complex Concentrated Alloys Through Grain Size Tailoring K. Ulybkina, K. Kamyshnykova, T. Pelachová and A. Klimová	89
Influence of Growth Rate on the Microstructure and Properties of EuBCO Bulk Superconductors Prepared by Top Seeded Melt Growth Process L. Vojtkova, P. Diko and M. Vojtko	95
Comparison of Properties of CeO₂ Doped ZrO₂ Samples Prepared by Conventional Sintering and by SPS M. Vojtko, P. Tatarko and V. Puchý	101
The Influence of the Final Machining Process on the Change of the Microstructure in the Surface Region of Austenitic Stainless Steels K. Bártová, M. Kudláč, M. Dománková, T. Vopát, M. Gavalec and D. Slněk	107

Microstructure and Hardness Distribution of Laser Powder Bed Fusion-Produced AISI 2507 Super Duplex Stainless Steel M.J. Dagnaw, Z. Brytan, D. Cimbala, V. Simkulet and S.W. Fita	113
---	-----

Chapter 4: Welding

Microstructure Characterization of a Dissimilar 14MoV6-3/T91 Weld after Long-Term Service Exposure at 580°C V. Vodárek, R. Palupčíková and P. Váňová	121
Evaluation of the Operational Degradation of ESW Pipeline Welds Z. Vávrovcová, Z. Veselka and J. Bajer	129
Evaluation of Interface between Alumina Dispersion Strengthened Copper Composite and Precipitation Strengthened Copper F. Kromka, O. Milkovič, J. Szabo, K. Ďurišinová, J. Ďurišin and I. Pethryshynets	135

Chapter 5: Tribology

Tribological Behavior of AlO-ZrO + 3YO Composites J. Andrejovská, D. Medved, M. Vojtko and V. Puchý	143
Tribological Behavior of ZrO₂-3Y₂O₃ Ceramics in Dry Reciprocating Sliding Against SiC Counterparts D. Medved, J. Andrejovská, M. Vojtko and V. Puchý	149

Chapter 6: Applied Materials and Engineering Applications

Polycrystalline Thermoelectric Materials with Observed Anisotropy F. Mihok, V. Puchý, J. Szabo, B. Ballóková, R. Džunda and K. Saksl	159
Gas Pressure Infiltration of Porous Ni-Al₂O₃-Al Compacts with Molten Aluminium A. Opálek, S. Kúdela Jr., M. Štěpánek, N. Beronská and K. Iždinský	165
Transition Metal Phosphide-Based Membrane Electrode Assembly for Cost-Effective Production of H₂ C. Bera, A. Gubóová, M. Strečková and A. Kovalčíková	173
Recycling of Zinc-Based Industrial Waste into Nanostructured Material for Potential Wastewater Treatment Applications E. Mudra, I. Shepa, K. Nemes, J. Piroskova, J. Klimko, P. Hviscova and O. Petrus	181
The Importance of Dislocations in the Work Hardening of Low-Carbon Steel during Cold Plastic Deformation T. Brlić, M. Matvija, S. Rešković and M. Lisnichuk	189
Application of Industrial Computed Tomography (ICT) in Dentistry on 3D Printed Co-Cr Dental Bridge A. Brlić, S. Čimić, J. Kos, I. Salarić, I. Keser and T. Brlić	197

Chapter 7: Metallographic Studies of Archaeological Metals

Copper Test Melts with Additions of Pb, Bi, As, Sb and Sn R. Haubner and S. Strobl	207
A Bronze Button from Late Bronze Age Site of Inzersdorf ob der Traisen R. Haubner and S. Strobl	215
Roman Bronze Objects from the Archaeological Site of Burg in Burgenland, Austria S. Strobl and R. Haubner	223

Chapter 8: Fatigue, Fractography and Failure Analysis

Effects of Ball Milling Time on CoCrFeNiTi High Entropy Sintered Alloys A. Fujii and A. Nishimoto	233
---	-----

Fracture Surface Morphology and Roughness of Ti-Scaffold Filaments J. Pokluda, J. Escherová and M. Kianicova	239
Metal Dusting Failure in an Aniline Processing Plant Z. Kuboň, J. Kosňovská and G. Rožnovská	247
Fractography and Microstructural Analysis of Fatigue Crack Propagation in Beta-Annealed Ti6Al4V Alloy after Fatigue Test J. Belan, M. Uhrčík, M. Slezák and V. Chvalníková	255
Influence of High-Pressure Hydrogen on Tensile Properties of Pipeline Steels Evaluated by Autoclave <i>In Situ</i> SSRT J. Kander and G. Rožnovská	263
Fracture Mechanisms of Aluminum Alloy Caused by Fatigue Tests M. Uhrčík, P. Palček, J. Belan, V. Chvalníková, M. Slezák and L. Šikyňa	269