

Table of Contents

Preface	iv
Recent Progress in Developing Bulk Nanostructured SPD Materials with Unique Properties R. Valiev	3
Processing Metals by Severe Plastic Deformation A. Rosochowski	13
Developing a Superplastic Forming Capability in Nanometals C. Xu, M. Furukawa, Z. Horita and T.G. Langdon	23
Effect of Non-Conventional Large Deformations on the Formation of Nanostructure in Materials K.J. Kurzydłowski, M.W. Richert, J. Richert, J. Zasadziński and M. Suś-Ryszkowska	31
Perspective of Nanomaterials Production, by Cyclic Extrusion Compression Method of Exerting Unconventional, Large Plastic Deformations M.W. Richert, S. Hawrylkiewicz, J. Richert and J. Zasadziński	37
New Possibilities of Achieving Ultrafine Grained Microstructure in Metals and Alloys Employing MaxStrain Technology R. Kuziak, W. Zalecki, S. Węglarczyk and M. Pietrzyk	43
Excellent Mechanical Properties of Nickel Processed by High Pressure Technique N.A. Krasilnikov, Z. Pakiela, W. Łojkowski and R. Valiev	49
Crystal Refinement by Cold Rolling in NiTi Shape Memory Alloys G.P. Dinda, H. Rösner and G. Wilde	55
Nanostructured Ni₃Al Intermetallic Alloy Processed by Severe Rolling at Liquid Nitrogen Temperature and Annealing P. Jóźwik, Z. Bojar, J. Bystrzycki and W. Przetakiewicz	61
Hydrostatic Extrusion and Nanostructure Formation in an Aluminium Alloy M. Lewandowska, H. Garbacz, W. Pachla, A. Mazur and K.J. Kurzydłowski	65
The Superplasticity of Hard Magnetic Alloy Fe-23wt.%Co-30%Cr with Submicrocrystalline Structure A.V. Korznikov, Z. Pakiela, G.F. Korznikova and K.J. Kurzydłowski	69
Microstructure and Mechanical Properties of Binary Al-Li Alloys Processed by ECAE J. Mizera, M. Lewandowska, A.V. Korznikov and K.J. Kurzydłowski	73
Morphology and Properties of Oxide Films Formed on the Nano-Metre 316L Austenite Steel A. Drużycka-Wiencek, M. Woźniak and K.J. Kurzydłowski	77
Strain Localization in Nano-Crystalline Iron Processed by Severe Plastic Deformation M. Suś-Ryszkowska, M. Miśkiewicz, Z. Pakiela and K.J. Kurzydłowski	81
Mechanical Properties of Nanostructured Iron Obtained by Various Methods of Severe Plastic Deformation M. Suś-Ryszkowska, Z. Pakiela, R. Valiev, J.W. Wyrzykowski and K.J. Kurzydłowski	85
Durability of Wheel Surface Layer in Railway Wheelsets L. Perchuć	91
X-Ray Investigations of the Natural and Artificial White Etching Layer M. Wojdyr, S. Gierlotka, J. Ivanisenko, W. Łojkowski and H.J. Fecht	97
Bulk Fe-Al-C Nanoalloys Made by Mechanically Alloying with Subsequent Spark Plasma Sintering and Their Mechanical Properties Y. Minamino, Y. Koizumi, N. Tsuji, N. Hirohata, K. Mizuuchi and Y. Ohkanda	103
Formation of Amorphous and Nanostructural Powder Particles from Amorphous Metallic Glass Ribbons Using Ball Milling and Electrical Discharge Milling A. Calka, D. Wexler, J. Bystrzycki and D. Oleszak	111
Nanocrystalline TiAl-V Intermetallics Hot Pressed from Ball Milled Powders J. Dutkiewicz and W. Maziarz	117
Size-Dependent Interdiffusion in Nanomaterials L.N. Paritskaya, Y.S. Kaganovsky and V.V. Bogdanov	123
Mechanical Properties of Aluminium Wires Produced by Plastic Consolidation of Fine Grained Powders H. Dybiec and P. Kozak	131

The Structure of Nanocrystalline Stainless Steel Powders Obtained by Ball Milling and Duplex Stainless Steel Formed by Their Sintering A. Szymańska, K. Sikorski and J. Kazior	135
Novel Ceramic-Metal Composites with Metal Phase from Micro to Nanosize K. Konopka	139
Al₂O₃-Fe Functionally Graded Materials Fabricated under Magnetic Field A. Oziębło, K. Konopka, E. Bobryk, M. Szafran and K.J. Kurzydłowski	143
Influence of Temperature and Pressure on the Possibility of Obtaining Al₂O₃/Ni-P Nanocomposite through Hot Pressing Process J. Michalski, K. Konopka, S. Gierlotka and K.J. Kurzydłowski	147
Investigation of the Microstructure of SiC-Zn Nanocomposites by Microscopic Methods: SEM, AFM and TEM A. Swiderska-Sroda, J.A. Kozubowski, A. Maranda-Niedbala, E. Grzanka, B.F. Palosz, A. Presz, S. Gierlotka, S. Stelmakh, G. Kalisz, N. Herlin-Boime and C. Lathe	151
Synthesis of Metal-Ceramic Nanocomposites by High-Pressure Infiltration S. Gierlotka, B.F. Palosz, A. Swiderska-Sroda, E. Grzanka, G. Kalisz, K. Fietkiewicz, S. Stelmakh and C. Lathe	157
Phase Transformations in Carbon Steel Powders Subjected to Ball Milling D. Oleszak, A. Janczewski and A. Grabias	165
Grain Boundary Microstructural Control in Nanocrystalline Ni and Ni-20mass%Fe Alloy by Magnetic Annealing T. Watanabe, S. Tsurekawa and G. Palumbo	171
Nanomaterials Produced by Ablation and Pulsed Laser Deposition B. Major	181
Physics of Growth of Thin Films Deposited by Laser Ablation W. Mróz	187
Nanocrystalline Thermoelectric Alloys: Processing, Chemistry and Characterization M.S. Toprak, Y. Zhang, Y. Jo, D.K. Kim and M. Muhammed	197
Production of Nanowires on Semiconductor Surfaces by Ion Bombardment J.B. Malherbe and H.W. Kunert	205
Micromechanical Properties of Nanometer-Thick Layers of Implanted Alumina J. Jagielski, A. Piatkowska, Z. Librant, P. Aubert, C. Legrand-Buscema, O. Maciejak, J. Piekoszewski and Z. Werner	213
The Electrocrystallization of Nanonickel B. Szeptycka, A. Gajewska-Midziałek and D. Derewnicka	217
Wettability and Reactivity between Molten Aluminum and Selected Oxides N. Sobczak	221
Multi-Layer Composite Based on Amorphous Materials and Quasicrystals, Deposited by Laser Ablation W. Mróz, M. Jelinek, Ł. Major, J. Morgiel, A. Prokopiuk, M. Woźniak and K. Kasuya	227
The Influence of a Nickel Layer with Nanosize Grains on an Aluminium-Ceramic Interface Structure A. Olszówka-Myalska	231
Microstructure of Nano-Crystallized Ni-P Layers Obtained by a Chemical Method K. Konopka, W. Zieliński, D. Oleszak, A. Wyszyńska, M. Trzaska and K.J. Kurzydłowski	235
Nanocrystallisation and Mechanical Properties of the Amorphous Ni-Zr-Ti-Al-Cu-Si Ribbons T. Czeppe, E. Vassileva and J. Dutkiewicz	241
Microstructure Selection in Severely Deformed Al-Base Systems G. Wilde, G.P. Dinda, R.J. Hebert and J.H. Perepezko	247
Nanocrystallisation in Lightweight Amorphous Alloys S.V. Madge, N. Boucharat, A.L. Greer and G. Wilde	253
Thermally Controlled Nanocrystallization in Amorphous Al Alloys J. Hamann, W.S. Tong, H. Rösner, J.H. Perepezko and G. Wilde	259
Crystallization Kinetics of Al-Mn-Ni-(Co,Fe) Alloys J.S. Blázquez, H. Dimitrov, J. Latuch and T. Kulik	265
Bulk Nanostructured Al-Based Alloys Produced by High-Pressure Hot Compaction H. Dimitrov, J. Latuch, T. Kulik, P. Kubecka and P. Svec	269

Amorphous Bulk Alloys from Al-Mn-Ni System Produced by Hot Compaction M. Kowalczyk, J. Latuch and T. Kulik	273
Structural Refinement and Coarsening in Deformed Metals N. Hansen, X. Huang and Q. Xing	279
Complex Procedures of Quantitative Description of Materials Microstructure J. Cwajna	287
Factors Affecting the Accuracy and Precision of Quantitative Description of Materials Microstructure J. Cwajna	297
Orientation Correlations in Metal Structures from the Micrometer to Nanometer Range D. Juul Jensen, J.R. Bowen and O.V. Mishin	307
Modelling of the Influence of the Grain Size Distribution on the Grain Growth in Nanocrystals T. Wejrzanowski and K.J. Kurzydłowski	315
A Physical Criterion for the Grain Subdivision during SPD N.A. Enikeev, T.S. Orlova, I.V. Alexandrov and A.E. Romanov	319
Synthesis of Nanoparticles of Vanadium Carbide in the Ferrite of Nodular Cast Iron E. Fraś, J. Głownia, E. Guzik and H.F. Lopez	325
Quantitative Description of Grain Size Changes during Annealing of Ultrafine-Grained Iron Produced by SPD J.J. Bucki and T. Płociński	329