

Table of Contents

Preface

Chapter 1: Properties and Processing of Structural Metals

Experimental Bench Tests on the Corrosion Resistance and the Environmental Safety of Structural Materials of the Cooling System of Nuclear Power Plant P. Kuznietsov and O. Biedunkova	3
The Iron-Carbon System: Genesis and Morphology of the Eutectic Involving Hyper-Cementite Carbide V. Mazur	11
The Role of Cell Collapse Mechanism in Mechanical Performance of Aluminium Foam Fabricated by Melt Processing O. Byakova, Š. Gnyloskurenko, A. Vlasov, Y. Yevych, N. Semenov and D. Kytranov	21
Features of Microstructural Evolution and Corrosion Behavior of Ti6Al4V Titanium Alloy Fabricated from Elemental Powder Blends S. Lavrys, I. Pohrelyuk, D.G. Savvakín, K. Shliakhetka and M.O. Danyliak	29
Method for the Determination of Rational Constructional and Technological Parameters for the Processes of Powder Materials Forming A. Mikhailov, Y. Shtefan, O. Mikhailov and M. Shtern	37
Optimization and Evaluation of Mechanical and Electrochemical Properties of Ferritic Stainless Steel Welding Using Taguchi Design M.F. Benlamnouar, N. Bensaid, M.O. Azzoug, T. Saadi, M. Zidani and R. Badji	45
Peculiarities Formation of Welded Joints under the External Electromagnetic Influence S.Y. Maksimov, O.M. Berdnikova, O.A. Prilipko, T. Alekseenko and Y. Polovetskyi	57

Chapter 2: High-Entropy and Amorphous Alloys

Nanocrystallization Behaviour of Amorphous Co₆₇Fe₄Cr₇Si₈B₁₄ Alloy Y. Nykyruy, S. Mudry, Y. Kulyk and I. Shtablavyi	67
Estimation of the Lattice Parameter and Lattice Distortion Based on the Results of <i>Ab Initio</i> Study of Structural Fragments of TiVZrNbMo, TiVZrNbHf, and TiVZrNbTa Multicomponent Alloys N. Rozhenko, L. Ovsianikova and V. Kartuzov	77
Thermophysical Properties of Cu-Based Subsystems of High-Entropy Alloys Y. Plevachuk, L. Romaka, I. Janotova, P. Svec, D. Janičkovič, R. Novakovic and V. Poverzhuk	85
Application of CALPHAD Method for Predicting of Concentration Range of Amorphization of Transition Metals Melts P. Agraval, M. Turchanin, L. Dreval and A. Vodopyanova	99
Structure and Properties of Melt-Quenched Al₄CoCrCuFeNi High-Entropy Alloy O.I. Kushnerov, V.F. Bashev and S.I. Ryabtsev	111
Low-Temperature Elastic Properties of Molybdenum Doped Non-Equiatomic High Entropy Alloys of the Fe-Co-Ni-Cr System Y. Semerenko, E. Tabachnikova, T. Hryhorova, S. Shumilin and V. Zoryansky	119

Chapter 3: Protective Coatings

Microstructure and Tribological Behavior of Plasma Sprayed (Ti,Cr)C-Ni Composite Coatings M. Storozhenko, O. Umanskyi, O. Melnyk, O. Terentyev, T. Chevychelova, V. Varchenko, O. Koval, V. Brazhevsky and O. Chernyshov	127
The Formation of C-S Coatings by Electrospark Alloying with the Use Special Process Media O. Haponova, V. Tarelnyk, N. Tarelnyk and P. Kurp	135

The Structure of Boride Diffusion Coatings Produced on Selected Grades of Structural Steels	
M. Góral, B. Kościelniak, K. Ochał, T. Kubaszek, J. Jopek and M. Drajewicz	145
Influence of Ni Content on Microstructure and Hardness of Nickel-Graphite Abradable Seal Coatings Produced by Plasma Spraying	
O. Umanskyi, O. Kushchev, M. Storozhenko, I. Martsenyuk, O. Terentyev, V. Brazhevsky, R. Kostyunik, O. Chernyshov and T. Mosina	151
Structural and Tribology Properties of Ti-Al-C Coatings Deposited by Vacuum Arc Method	
V. Podhurska, O. Kuprin, M. Bortnitskaya, O. Ostash, T. Prikhna, R. Chepil, V. Sverdun, I. Kolodiy and V. Belous	157
The Influence of Plasma Spraying Parameters on Microstructure and Porosity of Bronze-Polyester Coatings for Plain Bearings Applications	
M. Góral, T. Kubaszek, B. Kościelniak and D. Stawarz	167
Strength and Crack Resistance Structural Criteria of Composite Coatings Produced by the Method of Multi-Chamber Detonation Spraying	
V. Korzhyk, O.M. Berdnikova, P. Stukhliak, O. Kushnarova, J.J. Zhao and I. Skachkov	173

Chapter 4: Ceramics and Composite Materials

Cermet Powders Based on TiAl Intermetallic for Thermal Spraying	
O. Burlachenko, N. Vigilianska and C. Senderowski	183
Structural and Mechanical Properties of SiC-Rich By-Products of the Metal Grade Si Process	
T. Hafner, J. Hafner, F. Kimm, V. Bovda, O. Bovda, O. Kuprin, A. Pikalov, K. Lentsov, P. Shikhaylo, Y. Onyschuk, A. Tarasuk, V. Podhurska, B. Vasylyv, O. Shcheretsky, I. Vorona and R. Yavetskiy	193
Effect of Crystallization Properties of Continuous Basalt Fibers on Thermal Stability of Composite Materials	
S. Ivanitskii and Y. Chuvashov	201
Features of the Structural Formation of Tungsten Single Crystals in the Shape of Hollow Rotational Bodies	
Y. Nikitenko, V. Shapovalov, V. Yakusha, O. Gnizdylo and O.M. Berdnikova	207

Chapter 5: Special Nanomaterials

Spark Plasma Sintering of a Ceramic Material with a LaLuO₃ Perovskite-Type Structure	
V. Kolesnichenko, Y. Yurchenko, O. Kornienko, M. Zamula, A. Samelyuk, O. Shyrovkov, T. Tomila, A. Ragulya and A. Kotko	217
Modeling of Photovoltaic Characteristics of a TiO₂/Porous-Si/Si-Based Heterojunction Solar Cell	
A. Dyadenchuk	229
Synthesis of 2D-Material(G,GO,rGO,h-BN)-Magnetic(Fe,Fe₃O₄)Nanocomposites	
L. Chkhartishvili, S. Makatsaria, N. Barbakadze, O. Tsagareishvili, T. Batsikadze, S. Kekutia, V. Mikelashvili, K. Davitadze, T. Minashvili, M. Japaridze, M. Stephanishvili and R. Chedia	239
Structure and Characteristics of Opal - Bi₁₂GeO₂₀ and Opal - NaBi(MoO₄)₂ Nanocrystalline Composites	
M. Derhachov, V. Moiseienko, B. Abu Sal and A. Latyshova	255