

Table of Contents

Editors Note

Technical Résumé of the 5th International Symposium on Functionally Graded Materials B. Ilschner	3
General Aspects of FGM Fabrication by Powder Stacking U. Leushake, A.N. Winter, B.H. Rabin and B.A. Corff	13
Assembling of Mono-Sized Particles for the Percolation Control of Composition Graded Multi-Phase Packing Arrangements R. Watanabe, K. Ichiki, T. Hayama and A. Kawasaki	19
Investigations of Vibration Induced Particle Segregation for the Processing of FGM F. Muecklich, S. Beinstingel and W. Arnold	25
The Influence of Hydrodynamic Effects on the Adjustment of Gradient Patterns through Gravity Sedimentation of Polydisperse Particle Systems in Newtonian and Viscoelastic Fluids R. Bernhardt, F. Meyer-Olbersleben and B. Kieback	31
Fabrication of PSZ-SUS 304 Functionally Graded Disk H. Kobayashi	36
Understanding the P/M Fabrication of Ni/Al₂O₃ Functionally Graded Materials Y. Li and A. Zavaliangos	41
Discontinuously Graded Composites of Mo-Si₃N₄ as Thermal Barrier Materials B. Saruhan, W. Luxem, M. Bartsch, M. Schmücker and H. Schneider	47
Pure WC/Mo Functionally Graded Materials M. Omori, T. Kakita, A. Okubo and T. Hirai	53
Graded High-Porous Microfilters by Powder Metallurgical Coating Techniques D. Prinz, V. Arnhold, H.P. Buchkremer, A. Kuhstoss, P. Neumann and D. Stöver	59
A New Concept for Manufacturing Sintered Materials with a Three Dimensional Composition Gradient Using a Silicon Carbide - Titanium Carbide Composite C. Sand, J. Adler and R. Lenk	65
Fabrication Process for Continuous Magnesium/Carbon-Fibre Composites with Graded Fibre Content W. Schäff, M. Hagenbruch, C. Körner and R.F. Singer	71
Excimer Laser Processing of Ceramic-Based Functionally Graded Materials Y. Uchida, J. Yamada, H. Furuhashi, S. Watanabe, N. Hayashi and S. Higa	77
Development of Large-Size Ceramic/Metal Bulk FGM Fabricated by Spark Plasma Sintering M. Tokita	83
Forming of a Gradient Ceramic Material by Electrophoretic Deposition A. Börner, R. Herbig, M. Mangler and G. Tomandl	89
Graded Tribological Materials Formed by Electrophoresis C. Zhao, J. Vleugels, L. Vandeperre, B. Basu and O. Van der Biest	95
Polyethylene Gradient Material, Processing and Properties K. Schulte and A. Poeppel	101
Analysis and Simulation of Density Structure Formation in Integral-Skin-Foams H. Ehbing and W. Michaeli	107
Fibre-Reinforced Laminates with a Gradient in Resin Matrix C. Uhlig, E. Fliedner-Dimke, H. Goering, J. Bauer, M. Bauer, H. Queck and H. Frenzel	113
Formation of Graded Structures upon Shock Loading of SHS Products Y.A. Gordopolov	123
SHS a Gradient Materials in the Metal-Oxide Systems V.I. Yukhvid, V.N. Sanin and A.G. Merzhanov	128
Production of Metal - Ceramic FGM with High Resistance to Impacts I.P. Borovinskaya and A.N. Pityulin	134
Reactive Hot Pressing of Functional Graded Metal Matrix Composites H.J. Brinkman, J. Duczyzyk and L. Katgerman	140

Graded Material of Diamond Dispersed TiB₂-Si Composite by SHS/Dynamic Pseudo Isostatic Compaction	
M. Ohyanagi, T. Tsujikami, S. Sugahara, M. Koizumi, E.A. Levashov and I.P. Borovinskaya	145
SHS Materials of Graded Porosity	
I.P. Borovinskaya, A.G. Merzhanov and V.I. Uvarov	151
Spontaneous Infiltration of Non-Cylindrical Porosity: Large Pores	
J.L. Hilden and K.P. Trumble	157
Infiltration Processing of Metal-Ceramic FGM's	
F. Stromberger, R. Jedamzik, A. Neubrand and J. Rödel	163
Microstructure-Hardness Correlation in Graded, Dual-Scale Ceramic-Metal Composites Produced via Infiltration Processing	
F.R. Cichocki, Jr. and K.P. Trumble	169
A Technique of Elaboration of Functionally Graded Cermets	
G. Kapelski and A. Varloteaux	175
Graded Al₂O₃/Aluminide Bodies: Processing and Microstructure	
P. Rendtel, F. Wagner, R. Janßen and N. Claussen	181
Graded Metal Matrix Composites Produced by a Multi-Pouring Method with Controlled Mold Filling	
A. Güntner and P.R. Sahm	187
Layer Geometry within Multilayer Composites Produced by Centrifugal Consolidation	
R.J. Moon, E.N. Drewry, K.J. Bowman and K.P. Trumble	193
Three Dimensional Observation of Al₃Ti Platelets in Al-Al₃Ti FGMs Fabricated by Centrifugal Method	
H. Eryu and Y. Watanabe	199
Fabrication of Hybrid Al-(Al₃Ti+Al₃Ni) FGMs by Centrifugal Method	
T. Nakamura, Y. Kato and Y. Watanabe	205
Concentration Gradients in Aluminium Alloys Generated by Directional Solidification and Their Effects on Fatigue Crack Propagation	
B. Siber, M. Rettenmayr, C. Müller and H.E. Exner	211
Adhesion Enhancement of Covalent Thin Films by Parameter Graded Interface	
H. Leiste, M. Stüber, A. Kratzsch, S. Ulrich and H. Holleck	219
Bond Strength of Plasma Sprayed Chromium Oxide Coatings	
H.S. Kim, H.H. Yang, I.H. Oh and S.S. Kim	226
Structure and Residual Stresses in Thermally Sprayed Steel Coatings	
J. Dubsky, B. Kolman, P. Ctibor, F. Kroupa and J. Ilvasky	232
New Functionally Graded Coating Techniques: Powder-Eutectic and Powder-Liquid Coatings	
S. Kirihara and Y. Tomota	238
NiAl Coating of Carbon Steel by Reactive Sintering	
K. Matsuura, K. Ohsasa, N. Sueoka and M. Kudoh	244
FGM-Oxidation Protection System for Nonoxide Ceramics	
M. Bartsch, B. Saruhan, M. Schmücker and H. Schneider	250
Preparation and Corrosion Resistance of Graded Glass Coating on PbTe	
L. Chen, T. Goto, R. Tu, C. Guo and T. Hirai	256
Formation of FGM Coating by the New Method of Thermoreactive Electrospark Surface Strengthening (TRESS)	
E. Levashov, A.E. Kudryashov, E. Kharlamov, M. Ohyanagi, M. Koizumi and S. Hosomi	262
Study on the Coating of Oxidation Resistant Layer by SHS	
Y. Yamada, K. Shimojima, M. Nakanishi, M. Mabuchi, N. Saito, M. Nakamura and T. Asahina	271
Nanoscaled Gradient Materials by Chemical Vapor Synthesis	
S. Seifried, M. Winterer and H. Hahn	277
Cathodic Arc Evaporation of Functionally Graded Chromium Nitride Thin Films for Wear Resistant and Forming Applications	
A.M. Peters, J.J. Moore, I. Reimanis, B. Mishra and R. Weiss	283
Preparation of Functionally Graded ZnO Film by Electrochemical Reaction from an Aqueous Solution	
M. Izaki, H. Ishizaki, A. Ashida, T. Omi and T. Ito	290

Wear Properties of Surface-Oxidized TiAl-Sb S. Ikeno and K. Hasimoto	295
Oriented Growth of CuInSe₂ Thin Films by Means of Cu₂Se Interfaces A. Ashida, T. Nagata and T. Ito	301
Near-Surface Gradient Microstructures in Metastable Beta-Titanium Alloys for Improved Fatigue Performance A. Sveinbjörnsson and L. Wagner	307
Mechanical Behavior of a Graded Aluminum Alloy F. Bohner and J.K. Gregory	313
Diffusion Joining of Two Blocks of Magnesia via FGM Layer K. Atarashiya	319
Functionally Graded Bioceramics W. Pompe, S. Lampenscherf, S. Röbber, D. Scharnweber, K. Weis, H. Worch and J. Hofinger	325
Intelligent Modelling Mechanisms and Design Concepts of FGMs in Natural Composites F. Nogata	331
Functionally Graded Structure of Hemp Palm Branches S. Amada, Y. Terauchi and H. Hasegawa	338
Bone Bonding Studies and Implant Application of HA-G-Ti Functionally Gradient Composites S. Maruno, H. Iwata, S. Ban and H. Itoh	344
Fabrication and Properties of Functionally Gradient Bioactive Composites Comprising Hydroxyapatite Containing Glass Coated Titanium S. Ban, J. Hasegawa and S. Maruno	350
Biocompatibility of Titanium/Hydroxyapatite and Titanium/Cobalt Functionally Graded Implants F. Watari, A. Yokoyama, H. Matsuno, F. Saso, M. Uo and T. Kawasaki	356
Pore and Structure Formation in Collagen-Hydroxyapatite Precursors: Experiment-Model S. Lampenscherf, K. Weis and W. Pompe	362
Realisation of Graded Coatings for Biomedical Use S. Kyeck and P. Remer	368
Titanium Powder Sintering for Preparation of a Porous FGM Destined as a Skeletal Replacement Implant M. Thieme, K.-. Wieters, F. Bergner, D. Scharnweber, H. Worch, J. Ndop, T.J. Kim and W. Grill	374
Synthesis and Characterization of Grading Profiles in Plasma Sprayed NiCrAlY-Zirconia FGMs S. Sampath, W.C. Smith, T.J. Jewett and H. Kim	383
Measurement of Residual Stress in Plasma-Sprayed Composite Coatings with Graded and Uniform Compositions O. Kesler, J. Matějček, S. Sampath and S. Suresh	389
Graded EB-PVD Alumina-Zirconia Thermal Barrier Coatings-An Experimental Approach T. Krell, U. Schulz, M. Peters and W.A. Kaysser	396
Cyclic Thermal Fracture Behavior and Spallation Life of PSZ/NiCrAlY Functionally Graded Thermal Barrier Coatings A. Kawasaki and R. Watanabe	402
Research on the Application of PSZ/Ni FGM Thermal Barrier Coating to the Combustion Chamber (Damage Conditions of TBC and Its Mechanism) S. Moriya, Y. Kuroda, M. Sato, M. Tadano, A. Moro and M. Niino	410
Health Diagnosis of Functionally Graded C/SiC Coating on C/C Composites Y. Wakamatsu, T. Shoji, K. Ogawa and I. Hino	416
An Oxidation Resistant Metal-Ceramic Functional Gradient Material: Material Concept and Processing Requirements M. Willert-Porada and R. Borchert	422
Functionally Graded Ceramic Materials for High Temperature Applications for Space Planes T. Laux, A. Killinger, M. Auweter-Kurtz, R. Gadow and H. Wilhelm	428
High Heat Flux Thermal Cycling of FGM Thermal Barrier Coatings Using a HVOF Gun C. Verdy, G. Wolff, C. Coddet, D. Cornu and J.M. DeMonicault	434

Surface-Roughness Induced Residual Stresses in Thermal Barrier Coatings: Computer Simulations	
C.H. Hsueh, P.F. Becher, E.R. Fuller, S.A. Langer and W.C. Carter	442
Fracture Mechanical Modelling and Damage Characterization of Functionally Graded Thermal Barrier Coatings by Means of Laser Irradiation	
I. Hofinger, H.A. Bahr, H. Balke, G. Kirchhoff, C. Häusler and H. Weiss	450
Laser Generation of Graded Metal-Carbide Components	
T. Seefeld, C. Theiler, E. Schubert and G. Sepold	459
Microstructural Characterisation of TiC-TiN Gradient Coatings Deposited by Non-Reactive Magnetron Sputtering	
H. Leiste, M. Stüber, V. Schier and H. Holleck	467
Damage Mechanisms in Graded Hard Metals under Cyclic Loads	
S. Kursawe, R. Schulte and H.G. Sockel	476
Applications of WC-Co Gradient Materials	
P. Nicolae	482
Near-Net Shape Forming of Functionally Graded Cemented Carbide, Sinter-Bonded on Steel	
A. Ikegaya, K. Tsuda, K. Uchino, T. Miyagawa and Y. Suehiro	487
Functionally Graded TiC-Based Cermets	
M.P. Dariel, S. Sabatello, L. Levin and N. Frage	493
Thermophysical Properties of Al_2O_3-TiC_x (x = 0~1) Composites Prepared by Self-Propagating High-Temperature Synthesis (SHS)	
L. Chen, G. Groboth and E. Kny	500
Recent and Prospective Development of Functionally Graded Materials in Japan	
T. Hirai and L. Chen	509
Functionally Graded Piezoelectric Ceramics	
W.F. Shelley II, S. Wan and K.J. Bowman	515
Modeling of Graded 1-3 Composite Piezoelectric Transducers	
S. Hirsekorn, W. Gebhardt and W. Arnold	521
Broadband Ultrasound Transducers Using Piezoelectrically Graded Materials	
K. Yamada, J. Sakamura and K. Nakamura	527
Materials with an Acoustic Impedance Gradient	
G. Zimmermann and A. Schievenbusch	533
Preparation and Characterization of Substrates with Functionally Graded Dielectric Constant	
T. Nishida, G. Pezzotti and T. Shiono	539
Graded Dielectric Thin Films Prepared by Chemical Solution Deposition	
S. Hoffmann, R. Liedtke, R. Slowak, U. Hasenkox and R. Waser	544
Fabrication of Composition-Graded $\text{K}(\text{Nb,Ta})\text{O}_3$ Crystals and Their Dielectric Properties	
H. Yamane, K. Morita and M. Shimada	549
The Electrical and Photocatalysing Properties of a Functionally Graded Material Based on Titanium Oxide	
S. Watanabe, Y. Hobo, N. Hayashi, Y. Uchida, S. Higa, D. Dykes and G. Touchard	555
Advanced $(\text{Nb,Ti})_3\text{Sn}$ Superconducting Wire with Highly Strengthened and Good Conductive CuNb Composite Stabilizer	
K. Watanabe, M. Motokawa, T. Onodera, K. Noto, K. Katagiri and T. Saito	561
Functionally Graded Optical Polymer Materials Prepared Using UV-Curable Liquid-Crystals with an Electric Field	
S. Sato, T. Nose, S. Masuda and S. Yanase	567
Magnetic Properties of Fe-N Gradient Foils Irradiated with Nitrogen Plasma	
K. Niizuma and Y. Utsushikawa	573
Magnetic Functionally Graded Material Manufactured with α' to γ Reverse Martensitic Transformation in a Deformed SUS304 Stainless Steel	
H. Sakai, D. Morishita and Y. Watanabe	579
Multilayered and Granular Films of Fe with Covalent Metal Nitrides	
S. Kikkawa, M. Fujiki, H. Sugiyama, S. Enomoto and M. Takahashi	585
Graded Index Type Liquid Crystal Microlens Using Small Amount of Polymer	
H. Kusanagi, S. Masuda, T. Nose and S. Sato	591

Examination of $\text{Si}_{1-x}\text{Ge}_x$ Laterally Graded Crystals for Use in High Brilliance Synchrotron Beams	
M. Veldkamp, A. Erko, F. Schäfers, W. Gudat, N.V. Abrosimov, V. Alex, S. Rossolenko, V. Shekhtman, E. Shulakov, S. Khasanov and I. Smirnova	597
Micromechanical Modelling of Functionally Graded W-Cu Materials for Divertor Plate Components in a Fusion Reactor	
M.M. Gasik and S. Ueda	603
Functionally Graded Carbon Black Loaded Polymeric Materials	
V. Bouda	608
Development and Ballistic Testing of a Functionally Gradient Ceramic/Metal Applique	
W.A. Gooch, B.H.C. Chen, M.S. Burkins, R. Palicka, J.J. Rubin and R. Ravichandran	614
Behaviour Isotropic and Anisotropic of Materials under Impact	
A.V. Radchenko and S.V. Kobenko	622
Fabrication of W-Mo Functionally Graded Material with Density Gradient	
H.Q. Xiong, L.J. Zhang, J.L. Li, H. Tao and R. Yuan	628
Functionally Graded Cast Tools for Hot Forging Applications	
C. Pelz, H. Haferkamp, F.W. Bach and M. Niemeyer	634
Computational Design for Functionally Graded Thermoelectric Materials	
T. Hirano, J. Teraki and Y. Nishio	641
On the Composition Function of Graded Thermoelectric Materials	
J. Schilz, E. Müller, L. Helmers, Y.S. Kang, Y. Noda and M. Niino	647
Design of High Energy Density Thermoelectric Energy Conversion Unit by Using FGM Compliant Pads	
M. Kambe	653
Thermoelectric Properties of Sintered SiC Doped with Ge	
H. Inai, Y. Okamoto and J. Morimoto	659
Effect of Segment Length on Maximum Power of 2-Segmented n-PbTe with Different Carrier Concentrations	
Y. Imai, Y. Shinohara, Y. Isoda and I.A. Nishida	665
The New Mechanism of Abnormally High Energy Transferring in Functionally Graded Materials	
Y. Bilotsky and M.M. Gasik	669
Electric Properties of Ni/n-PbTe and Ni/p-Pb_{0.5}Sn_{0.5}Te Joined by Plasma Activated Sintering	
M. Orihashi, Y. Noda, L. Chen, Y.S. Kang, A. Moro and T. Hirai	675
Graded FeSi₂ Thermoelectric Elements - Preparation by Intermixed Additives Sintering	
E. Müller, K. Schackenberg, J. Schilz and W.A. Kaysser	681
Thermoelectric Properties Control due to Doping Level and Sintering Conditions for FGM Thermoelectric Element	
T. Kajikawa, K. Shida, K. Shiraishi, M. Ohmori and T. Hirai	687
Expansion of Utilizing Temperature Range of Bi₂Te₃/PbTe by FGM Forming	
M. Koshigoe, I. Shiota and I.A. Nishida	693
Thermoelectric Properties of Pb_{1-x}Sn_xTe FGM by Liquid Phase Diffusion Bonding	
M. Hashimoto, O. Ohashi, I. Shiota, H.T. Kaibe and I.A. Nishida	699
Thermoelectric Properties on Zn⁺ Ion Implantation into Polycrystalline Lead Telluride	
L.J. Zhang, J.L. Li, G. Wang and M. Ye	704
Effects of Sn⁺ Ion Implantation and Post-Implantation Annealing on the Thermoelectric Properties of n-Type PbTe in FGM Design	
Q. Shen, L.J. Zhang, G. Wang, L. Chen, R. Tu and T. Hirai	711
Electrical Properties and Structure of Sn⁺ Ion Implantation Polycrystalline Lead Telluride	
L.J. Zhang, Q. Shen, G. Wang, L. Chen, R. Tu and T. Hirai	717
Barrier and Resonance Scattering of Bi₂Te₃-Based Compounds	
M.K. Zhitinskaya, S.A. Nemov, T.E. Svechnikova and L.D. Ivanova	725
Adaptability of AgSbTe₂ to FGM	
S. Yoneda, É. Ohta, Y. Shinohara, T. Kimura, I.A. Nishida and H.T. Kaibe	731
Porous Thermoelectric Materials with Functionally Graded Structures	
H.Y. Yasuda, I. Ohnaka, H. Kaziura and T. Yano	736

Fabrication of Functionally Graded Thermoelectric Coatings by Plasma Spraying of Mechanically-Alloyed Composite Powders	
M. Fukumoto, Y. Tokimoto, H. Mikawa and Y. Tanaka	742
Thermal Spraying of FGMs for Thermoelectric Devices	
E. Lugscheider and G. Langer	748
Real Condition Test of Graded Thermoelectric Elements	
E. Müller, J.U. Bruch and J. Schilz	754
One-Step Sintering of Thermoelectric Conversion Units in the W/TiB₂/SiGe and W/MoSi₂/SiGe Systems	
J.S. Lin, Y. Miyamoto, K. Shibata, K. Hirota and O. Yamaguchi	760
Powder Metallurgical Processing and Properties of Copper/Tungsten Gradients	
U. Birth, M. Joensson and B. Kieback	766
Re/W/Mo and Ir/W/Ta Graded-Structure Emitters of Thermionic Energy Converter	
M. Katoh, K. Okamoto, H. Horita and T. Igarashi	774
Characterisation of Electrochemically Processed Graded Tungsten/Copper Composites	
R. Jedamzik, A. Neubrand and J. Rödel	782
Improved Catalytic Properties of Solid Oxide Fuel Cell (SOFC) Anodes by Coated Ni/YSZ	
U. Flesch, J. Meusinger, A. Naoumidis and D. Stöver	788
Microstructure and Interdiffusion Phenomena in YSZ-CGO Composite Electrolyte	
A. Tsoga, A. Naoumidis, A. Gupta and D. Stöver	794
Thermal Spraying and Performance of Graded Composite Cathodes as SOFC-Component	
K. Barthel and S. Rambert	800
Development of Graded Composite Electrodes for the SOFC	
C. Gerk and M. Willert-Porada	806
Simulation of Pressure Filtrating Process for Making Porosity Graded Silicon Carbide Evaporator Tubes	
M. Dröschel, R. Oberacker and M.J. Hoffmann	814
Silicon Carbide Evaporator Tubes with Porosity Gradient Designed by Finite Element Calculations	
M. Dröschel, R. Oberacker, M.J. Hoffmann, W. Schaller, Y.Y. Yang and D. Munz	820
Analysis of Macro and Micro Residual Stresses in Functionally Graded Materials by Diffraction Methods	
D. Dantz, C. Genzel and W. Reimers	829
Fracture Testing and Analysis of a Layered Functionally Graded Ti/TiB Beam in 3-Point Bending	
R.D. Carpenter, W.W. Liang, G.H. Paulino, J.C. Gibeling and Z.A. Munir	837
Productive Techniques of Functionally Graded Materials Used of Fly Ash	
N. Hayashi, H. Taguchi, T. Yamamoto, S. Watanabe, Y. Uchida, S. Higa and D. Dykes	843
Using Vickers Indentation to Probe Residual Stresses in Ductile/Brittle Joints with Graded Compositions	
I. Reimanis, R. Torres, C. Muratore and J.J. Moore	849
Internal Stress and Fracture Behaviour of Symmetric Al₂O₃/TiC/Ni FGMs	
J.S. Lin and Y. Miyamoto	855
Non-Destructive Characterisation of Anisotropy in One-Component Composites as Functionally Graded Materials	
R. Steegmueller, K. Nixdorf, K. Stellbrink and G. Busse	861
Characterization of Volume Properties of Powder Metallurgical Parts by Computerized Tomography	
J. Goebbels, B. Illerhaus, G. Weidemann and K. Pischang	867
Mechanical Characterisation of Graded Materials by Ultrasonic Microscopy with Phase Contrast	
J. Ndop, T.J. Kim and W. Grill	873
Characterisation of Graded Coatings Using GD-OES	
D. Delfosse	879
Characterization of Thin Ceramic Layers with a Graded Pore Structure	
T. Moritz, G. Werner, G. Tomandl, M. Mangler, H. Eichler, U. Lembke and W. Hauffe	884
Scanning Thermo Probe Technique - A Method for High Resolution Characterization of Graded Semiconductors and Metals	
P. Reinshaus, H. Süßmann, G. Erz, U. Kramer and W. Heiliger	890

Estimation of Thermal Diffusivity Profile in an FGM from Temperature Responses at the Front and Rear Surfaces A. Makino and N. Araki	896
Oxidation and Thermal Shock Resistance of SiC Compositionally Graded Carbon Fiber-Reinforced Carbon Composite Materials R. Yamada and K. Fujii	902
Characterization of Surface Heterogeneity of Carbon-Composite Adsorbents A.M. Puziy and O.I. Poddubnaya	908
On the Spallation of FGM Coatings F. Erdogan and T.C. Chiu	917
Functionally Graded Ti-TiC Multilayers: The Effect of a Graded Profile on Adhesion to Substrate I. Dahan, U. Admon, J. Sarel, B. Yahav, M. Amar, N. Frage and M.P. Dariel	923
Modelling of Thermal Residual Stresses in Graded Ceramic Coatings V. Teixeira, M. Andritschky and D. Stöver	930
Stress Analysis in Thin Graded $\text{Al}_2\text{O}_3/\text{ZrO}_2$ TBC Systems U. Leushake, Y.Y. Yang and W. Schaller	936
Stress Optimization in Applications with Functionally Graded Materials W. Schaller and Y.Y. Yang	942
Stress Analysis in a Joint with Functionally Graded Materials Considering Material Creep Behavior Y.Y. Yang	948
A Statistical RKR Fracture Model for the Brittle Fracture of Functionally Graded Materials T.L. Becker, Jr., R.M. Cannon and R.O. Ritchie	957
The Influence of the Yield Strength Gradient on the Fracture Resistance in FGMs O. Kolednik and S. Suresh	963
Gradient Elasticity Theory for a Mode III Crack in a Functionally Graded Material G.H. Paulino, A.C. Fannjiang and Y.-. Chan	971
Modelling of the Deformation Behaviour of FGM S. Raßbach and W. Lehnert	977
A Simulation Model for the Design of Functionally Graded Materials under Thermo-Mechanical Loads W. Hufenbach, G. Archodoulakis and M. Lepper	983
Optimal FGMs, and Plain Awful Composites M. Ferrari, F. Rooney and J.C. Nadeau	989
A Random Microstructure Finite Element Method for Effective Properties of Functionally Graded Materials P.C. Zhai, Q.J. Zhang and R.Z. Yuan	995
Mesomechanical Modelling of Composites Containing FGM Related Interpenetrating Microstructures Based on Micromechanical Matricity Models M. Dong, P. Leßle, U. Weber and S. Schmauder	1000
Optimization Method of FGM Compositional Distribution Profile Design by Genetic Algorithm K. Shimojima, Y. Yamada, M. Mabuchi, N. Saito, M. Nakanishi, I. Shigematsu, M. Nakamura, T. Asahina and T. Igarashi	1006
WC-Based Hardmetal Structural Modelling: Guidelines for the Interpretation of Structural Aspects U.U. Gomes, A.C. Buriti and A.G.P. Silva	1012
Residual Stress States of Graded CuW Materials G. Bokuchava, J. Schreiber, N. Shamsutdinov and M. Stalder	1018
Design of Diamond Gradually - Dispersed Material by FEM T. Tsujikami, M. Ohyanagi, M. Koizumi, E.A. Levashov and I.P. Borovinskaya	1024
A Thermal Damage-Heat Conduction Coupled Model of Ceramic-Metal Functionally Graded Materials Q.J. Zhang, P.C. Zhai and R.Z. Yuan	1030
Distortions and Cracking of Graded Components during Sintering H. Riedel and T. Kraft	1035

A Constitutive Model for Sintering of Mixed Powder Compacts K. Shinagawa and Y. Hirashima	1041
Modelling of Damage Accumulation under Sintering of Particulate FGM A. Maximenko and O. Van der Biest	1047