ISBN(softcover): 978-0-87849-852-9 ISBN(eBook): 978-3-0357-0549-2

Table of Contents

Preface

In Memoriam Prof. M. Káldor
F. Tranta 1

Nucleation in Undercooled $Ge_{73.7}Ni_{26.3}$ Alloy Melt Induced by Ni, Cu and Si Clusters
W.K. Wang, R.P. Liu, Z.H. Zhou, L.M. Cao and L.L. Sun 5

Rapid Crystal Growth in Undercooled Hypoeutectic Cu-Sb Alloys
J.R. Gao, N. Wang and B. Wei 13

Solute Trapping in Highly Undercooled Succinonitrile-Acetone Alloys
A. Ludwig, A. Schillings and G. Ehlen 19

Columnar to Equiaxed Transition in a Refined Al-Cu Alloy under Diffusive and Convective Transport Conditions
M.D. Dupouy, D. Camel, J.E. Mazille and I. Hugon 25

Experimental Verification of the Solute Redistribution in Cellular/Dendritic Solidification of the Al-3.5Li and Fe-4.34Ni Alloys
J. Kloch, B. Billia, T. Okane, T. Umeda and W. Wołczyński 31

Microstructure and Microsegregation in LASER Resolidified Fe-Cu Alloys
L. Ladeuille, D. Daloz, C. Barat, W. Kurz and G. Lesoult 37

Determination of Mushy Zone Permeability in Equiaxed Al-Cu Alloys
Ø. Nielsen, L. Arnberg, A. Mo and H.J. Thevik 43

Modelling of Microsegregation of Binary Solid Solutions
I. Kuti and A. Roósz 49

Microstructures of Alloy Solidified in an Extremely Wide Range of Cooling Rates
E. Hornbogen 57

Twinned Feathery Grains and Related Morphologies in Aluminum Alloys
S. Henry and M. Rappaz 65

Effect of Microstructural Features on the Austempering Heat Treatment Processing Window
H. Bayati and R. Elliott 73

Investigation of Secondary Dendrite Arm Coarsening of Al-Cu-Si Alloy
V. Rontó and A. Roósz 79

The Effect of Convectional Flow in Vertical Directional Solidification
T. Mori, M. Li and H. Iwasaki 87

Modeling Segregation and Convection during the Growth of Ternary Alloys under Terrestrial and Microgravity Conditions
J.J. Derby, N. Ponde, V.F. de Almeida and A. Yeckel 93

3D Simulation of Surface Tension Driven Interdendritic Convection and Microsegregation during Laser Surface Alloying
E.W. Kreutz and N. Pirch 99

Influence of Convection and Surface Effects on Macrosegregations in Eutectic and Peritectic Systems
G. Ehlen, A. Schweizer, A. Ludwig and P.R. Sahm 105

Effect of Grain Refinement on Macrosegregation in Direct Chill Semi-Continuous Casting of Aluminium Sheet Ingot
A. Joly, G.U. Grün, D. Daloz, H. Combeau and G. Lesoult 111

Interfacial Criteria to Avoid Pushing of Particles during Solidification of Metal Matrix Composites
G. Kaptay 121

Hydrodynamics of Moving Structures during a Static Solidification Process
C. Stomp, H. Combeau and B. Appolaire 127

Behaviors of Bubbles in Front of a Solidifying Interface
Z. Wang and K. Mukai 139

Resolidification of Metal Matrix Composites in Microgravity
L. van Vugt and L. Froyen 145

Interfacial Forces and Energies Relevant to Production of Metal Matrix Composites
G. Kaptay, E. Báder and L. Bolyán 151

Application of Interfacial Demarcation Technique under Solidification of Bi 1%Sb Alloy Containing ZrO_2 Particles
N. Babcsán 157

Transition of Flake into Fibre Structure in Eutectic Al-Si
R. Cupryś, B. Major and W. Wołczyński 161

Solidification Microstructure Investigation of a Ni-Ni_3Si Eutectic Alloy
S. Milenkovic and R. Caram 167

Containerless Solidification of Peritectic and Eutectic Ceramics Using Aero-Acoustic Levitator
K. Nagashio, H. Takamura and K. Kuribayashi 173

Eutectic Mircostructure Evolution in a Directionally Solidified Nb-Al Alloy
C.T. Rios, S. Milenkovic and R. Caram 179

Formation of Austenite in Peritectic Fe-C-X Alloy
E.P. Kalinushkin, E. Fraś, W. Kapturkiewicz, A.A. Burbelko and J. Sitalo 185

Effect of Liquid Phase Diffusion on the Mechanism of Peritectic Transformation in Alloy Steels
E.P. Kalinushkin and Y. Taran 191

Peritectic Coupled Growth in Nd-Based Superconducting Oxides from Highly Undercooled Melt
K. Nagashio, K. Kuribayashi and Y. Takamura 197

Monotectic Composite Growth with Fluid Flow
C. Stöcker and L. Ratke 203

Effect of Convective Instability in Directionally Solidified Hypermonotectic Al-In Alloys
L.J. Hayes and J.B. Andrews 209

Universal Multi-Zone Crystallizator, the ISS Oriented Hungarian Apparatus
P. Bárczy 219

Thermal Behavior in Unidirectional Cooling of Some Materials under Microgravity
M. Kudoh and T. Noguchi 229

Directional Solidification of Bi-Sn on USMP-4
H. Stenzel, H. de Groh III, E. Leonardi, V. Timchenko and G. de Vahl Davis 235

Microgravity Solidification of Al-In Alloys
J.B. Andrews, L.J. Hayes, Y. Arikawa and S.R. Coriell 247

Gravitational Influence on the Microstructure of Directionally Solidified Monotectic and Eutectic Alloys
I. Aoi, M. Yoshida, S. Murao and H. Nakae 259

Solidification of $Pb_{40}Ni_{40}P_{20}$ Alloy on Board Chinese Recoverable Satellite
L.L. Sun, Q.J. Wu, R.P. Liu, Z.X. Qin, Z.H. Zhou and W.K. Wang 265

Cellular Growth in Transparent Model Substances under Microgravity and Ground Based Conditions
B. Kauerauf, G. Zimmermann and S. Rex 271

Investigation on Morphological Instability during Directional Solidification on a Sounding Rocket
A.H. Weiss, G. Zimmermann, S. Rex and S.R. Coriell 277

Containerless Solidification of Undercooled Ag-Cu-Sb Alloy Droplets under Microgravity Conditions
J.R. Gao and B. Wei 285

Effect of Direction of Solidification on the Dendritic Structure
C. Póliska, K. Tomolya, J. Kovác, Z. Gácsi and M. Réger 291

Solidification of Anisotropic Semiconducting Material - Tellurium under Microgravity Conditions
R.V. Parfeniev, I.I. Farbshtein, I.L. Shulpina, S.V. Yakimov, V.P. Shalimov, A.M. Turchaninov, A.I. Ivanov and S.F. Savin 297

Influence of Gravity on Microstructural Transitions in Directional Solidification on Refined Al-Ni Alloys at Low Growth Rates
M.D. Dupouy, D. Camel and L. Deferm 305

The Effect of Gravitation Forced Convection on Structure of Al-Ni Eutectic
V. Mertinger and P. Bárczy 309

Recent Theoretical Development on Solidification Processing with High Temperature Gradient
Y. Miyata and M. Takeda 317

Modelling of Microsegregation
X. Doré and M. Rappaz 331

Experimental and Numerical Investigation of Remelting Phenomena
M. Rettenmayr, O. Warkentin and M. Rappaz 339

Mass Conservation for Microsegregation and Solute Redistribution in Cellular/Dendritic Solidification with Back-Diffusion
W. Wołczyński and J. Kloch 345

Analytical Modelling of Solidification during Temperature Gradient TLP Diffusion Bonding
A.A. Shirzadi and E.R. Wallach 351

Application of a Nodular Iron Microstructure Model for an Industrial Casting
M.I. Onsøien, P. Misic, Ø. Grong, Ø. Gundersen and A.L. Dons 361

Modeling of Copper Microsegregation in Continuously Cast Steel Billets
M.N. Srinivasan and A.M. Shahhosseini 369

Two-Phase Modelling of Mushy Zone Parameters Associated with Hot Tearing
I. Farup and A. Mo 377

Modeling of the Solidification Process under Non-Steady-State Conditions
M. Réger and T. Réti 383

Modelling of Solidification Microstructures
M. Rappaz, J.-. Desbiolles, C. Gandin, S. Henry, A. Sémoroz and P. Thévoz 389

Computer Simulation of the Various Types of Nonmetallic Inclusions Formation During Solidification of Low-Carbon Steels
T.T. Nghiem, A.V. Dub and A.F. Vishkarev 397

Solidification of a Sphere Composed of Binary Alloys
T. Czibere, F. Karaffa and L. Kalmár 403

Modelling of Nodular Cast Iron Graphite Growth in Solid State
E. Fraś, A.A. Burbelko and W. Kapturkiewicz 409

Modeling and Testing the Thermal Behavior of UMC
J. Szőke, A. Roósz, B. Tolvaj and T. Roósz 415

Recent Continuous Casting Technologies of Steel in Japan
T. Umeda 423

Feeding Range of the Cast Steel
A. Chojecki and I. Telejko 435

Development of Steel Plate - Cast Iron Hybrid Casting Process for Recycling of Low Level Radioactive Metal Waste
H. Nakamura, T. Hirabayashi, J. Akimoto, K. Takahashi, H. Shindo, D. Sakurai, A. Almansour, T. Okane and T. Umeda 441

Comparison of the Semisolid Shear Behaviour of Al-7Si-0.35Mg Alloys Produced by Two Casting Methods
H. Wang, D.H. StJohn, C.J. Davidson and M.J. Couper 449

Assessment of Metal/Mould Interfacial Heat Transfer during Solidification of Cast Iron
K.N. Prabhu and W.D. Griffiths 455

Experimental and Numerical Investigations of Mould Filling of Thin Wall Horizontal Aluminium Castings
R. Van Tol, L. Katgerman and H.E.A. Van den Akker 461

Interfacial Heat Transfer between a Solidifying Aluminium Alloy and a Coated Die Steel
C.P. Hallam, W.D. Griffiths and N.D. Butler 467

Fabrication of 5052 Aluminum Alloy Thin Slab by Electromagnetic Casting and Mechanical Properties of Its Cold-Rolled Sheet
S. Kamado, T. Kosaka, Y. Kabayama, Y. Kojima, T. Muramatsu and M. Matsuo 473

Investment Casting in Silica Aerogels
D. Tscheuschner and L. Ratke 479

Application of Semi-Solid Forming to 2024 and 7075 Wrought Aluminum Billets Fabricated by the EMC Process
R.S. Rachmat, H. Takano, N. Ikeya, S. Kamado and Y. Kojima 487

Thermomechanical Effects in DC Casting of Aluminium Alloy: A Numerical Benchmark Study
J.M. Drezet, A. Burghardt, H.G. Fjaer and B. Magnin 493

Dimensional Changes of Cast Iron during Crystallisation at Different Mold Parameters
J. Dúl, Z. Gedeonová and G. Szalai 501

Calorimetry of Undercooled Metals and Alloys
L. Battezzati, M. Baricco, A. Castellero, P. Perotto and P. Rizzi 507

Specific Heat and Solidification of Undercooled Bi-Sb Alloy Melts
Z.H. Zhou, J.H. Zhao, L.L. Sun, D.Y. Dai and W.K. Wang 513

Equilibria in the Ternary Fe-Al-N System
M.S. Yaghmaee, G. Kaptay and G. Jánosfy 519

Rapid Compression Testing of Semi-Solid Alloy Slugs
P. Kapranos, H.V. Atkinson and D.H. Kirkwood 525