

# Table of Contents

## Preface and Organizers

## TiAl Alloys and Advanced Structure Intermetallics

|                                                                                                                                                                                                     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Preparation of Multilayered Ti-Al Alloys by Solid Reaction</b><br>Y.B. Sun, M.W. Liu, S.J. Ge, F.M. Ma and C.L. Ma                                                                               | 1   |
| <b>Lattice Structures of AlSc and their Effect on Interdiffusion</b><br>J. Li, F. Ye, L. Huang and Y.F. Liang                                                                                       | 9   |
| <b>Microstructure Evolution of TiAl under Tensile Impact Loadings</b><br>X. Zan, L. Ouyang, Y. Wang, Y.H. He, Y. Liu and W.D. Song                                                                  | 14  |
| <b>The Effect of Stoichiometry and Degree of Order on Mechanical Properties of Ni<sub>3</sub>Fe Intermetallics</b><br>Y.X. Chen, H.Y. Qian and T. Chen                                              | 19  |
| <b>Fabrication and Properties of Rapidly Quenched Fe-6.5wt.%Si Alloy Ribbons</b><br>R.Q. He, J.P. He, X.S. Fang, X.O. Jin, Y.F. Liang, F. Ye and J.P. Lin                                           | 25  |
| <b>Numerical Simulation and Process Optimization of Directional Solidification of Nb Containing High Silicon Steel</b><br>K. Yang, F. Ye, Y.F. Liang and J.P. Lin                                   | 31  |
| <b>Microstructure Transformation of a Refined High Nb Containing TiAl Alloy</b><br>L.H. Chai, L. Yang, J.P. Zhang, Z.Y. Zhang, L.Q. Zhang and J.P. Lin                                              | 38  |
| <b>Effect of Al on Microstructures and Properties of Ti-45Al-8.5Nb-0.2B-0.2W Alloy</b><br>X.J. Xu, J. Lin and D.D. Han                                                                              | 44  |
| <b>Numerical Analysis of Superplastic Bulging Process of TiAl Sheet</b><br>C.Y. Wang, J.S. Li, B. Tang and H.C. Kou                                                                                 | 50  |
| <b>Effect of Nb Addition on the Corrosion Behavior of Porous TiAl Based Alloys in Aqueous Environments</b><br>F. Yang, X. Li, N. Tian, Y.F. Liang and J. Lin                                        | 57  |
| <b>Intrinsic Brittleness of Mo<sub>3</sub>Si by First-Principle Calculations</b><br>L.Q. Zhang, W. Du, M. Wang, Y.M. Hou, X.D. Ni and J.P. Lin                                                      | 63  |
| <b>Isothermal Corrosion Behaviors of TiAl-Nb Alloys in Liquid Zn-55Al-1.6Si (wt.%)</b><br>P.F. Sun, X.O. Jin, Y.F. Hu and J. Lin                                                                    | 69  |
| <b>Laser Remelting Effect on the Joint Property of Diffusion Bonding of TiAl Intermetallics and TC4 Alloy</b><br>Z.G. Xue, Y.X. Huang, Y.T. Wang and X.J. Hai                                       | 77  |
| <b>The Influence of Niobium on the Interdiffusion Coefficients in <math>\alpha_2</math> and <math>\gamma</math> of TiAl Alloys</b><br>D.D. Han, X.J. Xu, L.Q. Zhang, Y.F. Liang and J. Lin          | 85  |
| <b>Effects of Scandium on Corrosion Resistance and Mechanical Properties of Cellular Al-Based Foams</b><br>L. Huang, D.H. Yang, H. Wang, F. Ye and Z.P. Lu                                          | 93  |
| <b>Preparation of TiAl Intermetallic Alloy by Gelcasting</b><br>Q. Ye, Z.M. Guo, Q.K. Duan, C.L. Yang and J.J. Hao                                                                                  | 101 |
| <b>Numerical Simulation and Process Optimization of Investment Casting of the Blades for High Nb Containing TiAl Alloy</b><br>L. Yang, L.H. Chai, L.Q. Zhang and J. Lin                             | 105 |
| <b>The Microstructure and Compression Behavior of Multi-Step Forging Ti-45Al-8Nb Alloy after Annealing at 1100 °C</b><br>L. Song, X.J. Xu, J. Lin and L.Q. Zhang                                    | 111 |
| <b>Influence of Exposure at 750°C on Room Temperature Tensile Ductility of Cast TiAl Alloy with the Directional Lamellar Microstructure</b><br>C.L. Zhu, X.W. Zhang and J. Zhang                    | 115 |
| <b>Investigation on B, Cr Doped Ni<sub>3</sub>Al Alloy Prepared by Self-Propagation High-Temperature Synthesis and Hot Extrusion</b><br>L.Y. Sheng, J.T. Guo, C. Yuan, F. Yang, G.S. Li and T.F. Xi | 124 |
| <b>Room Temperature Brittleness of T2 in the Mo-Si-B System</b><br>K.M. Pan, L.Q. Zhang, W. Du and J.P. Lin                                                                                         | 132 |

|                                                                                                                                                                                               |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Microstructure and Mechanical Properties of TiAlNb Coating Deposited by APS and HVOF Spraying</b><br>H.J. Zeng, L.Q. Zhang, X.Y. He, Y.C. Zhang, P. Jia and J. Lin                         | 139 |
| <b>Aerospace Materials</b>                                                                                                                                                                    |     |
| <b>A Study of Laser Cladding on the NiCr/Cr<sub>3</sub>C<sub>2</sub>-WS<sub>2</sub>-CaF<sub>2</sub> Coating</b><br>S.F. Chen, C.L. Feng, J. Yang and J.S. Chen                                | 146 |
| <b>Experimental Research on the Friction and Wear Properties of Ni-Based Composite Coating Prepared by Laser Cladding</b><br>S.F. Chen, C.L. Feng, J. Yang and J.S. Chen                      | 152 |
| <b>Advanced Magnesium Alloy and Application</b>                                                                                                                                               |     |
| <b>Effect of Heat Treatment on the Structure and Properties of EW75 Magnesium Alloy Plate</b><br>J. Qu, K. Zhang, M.L. Ma, Y.J. Li and X.G. Li                                                | 158 |
| <b>Manufacturing Technology of Magnesium Alloy Bicycle Parts</b><br>Z.M. Shi, L.Y. Niu, J.X. Lin, D.R. Sun, Y. Li, L. Zhao and G.Y. Li                                                        | 166 |
| <b>Residual Stresses in Spray Quenched EW75 Magnesium Alloy</b><br>H.B. Liao, M.L. Ma, X.G. Li, K. Zhang, Y.J. Li and G.L. Shi                                                                | 172 |
| <b>Microstructure and Properties of MAO Coatings for AZ91D Magnesium Alloy in Varies Work Mode</b><br>X.J. Cui, X.Z. Lin, C.H. Liu, R.S. Yang and M.T. Li                                     | 178 |
| <b>Effect of Zn Addition on Microstructure and Mechanical Properties after Extrusion, Rolling and Ageing in Mg-9Gd-3Y-0.5Zr Alloys</b><br>W.N. Tang, S.Q. Li, R. Chen, E.H. Han and W. Ke     | 184 |
| <b>Dynamic Precipitation Behaviors and Mechanical Properties of Mg-12Gd-3Y-0.5Zr Alloy Processed by Secondary Extrusion</b><br>D.J. Li, Y.P. Zhou, X.Q. Zeng, W.J. Ding, B. Chen and Y.Z. Liu | 192 |
| <b>Processing and Microstructures of <math>\delta</math>-Al<sub>2</sub>O<sub>3</sub>/ AE44 Composite Synthesized by SS-HPDC</b><br>L. Li, D.J. Li and X.Q. Zeng                               | 198 |
| <b>Deformation and Workability Evaluation of GW103K Magnesium Alloy in Hot Compression</b><br>R.X. Yu, S.Y. Wang, Q. Tang and X.Q. Zeng                                                       | 204 |
| <b>Experimental and Numerical Investigation of the Grain Size Evolvment of AZ31 Mg Alloy during High Ratio Extrusion</b><br>J.B. Lin, L.F. Ma, Y.X. Chen, C. Wang, Q.X. Liang and X.C. Cui    | 211 |
| <b>Formation of a New Mg-Cu-Ni-Gd Bulk Metallic Glass: Effects of Rare Earth on Glass-Forming Ability of Mg-Tm-Re Bulk Metallic Glasses</b><br>J. Yin, Z.J. Zhou, Z.P. Qi and Y. Liu          | 217 |
| <b>Effect of Rolling Reduction on Microstructure and Mechanical Properties of Mg-9Gd-3Y-0.5Zr Alloys</b><br>S.Q. Li, W.N. Tang, R. Chen, E.H. Han and W. Ke                                   | 223 |
| <b>Effects of Heat Treatments on Corrosion Behavior of Mg AT72 Alloy</b><br>Z.Q. Wang, D.J. Li, X.Q. Zeng, X.M. Wu and W.J. Ding                                                              | 230 |
| <b>Effect of Sm on the Microstructure and Mechanical Property of Mg-xSm-0.4Zn-0.3Zr Alloys</b><br>X. Su, D.J. Li, Y.C. Xie, X.Q. Zeng and W.J. Ding                                           | 238 |
| <b>Effects of Gd on the Microstructure and Mechanical Properties of Mg-3Sn Alloys</b><br>J. Luo, R. Chen and E.H. Han                                                                         | 245 |
| <b>Microstructures and Mechanical Properties of a New Biomedical Material Mg-13Li-X Alloys</b><br>Y.C. Zhang, S. Luo, Q.Q. Zhang, X.Q. Xu and T.T. Zhou                                       | 251 |
| <b><i>In Vitro</i> and <i>In Vivo</i> Studies on a MgLi-X Alloy System Developed as a New Kind of Biological Metal</b><br>S. Luo, Q.Q. Zhang, Y.C. Zhang, C. Li, X.Q. Xu and T.T. Zhou        | 257 |
| <b>Microstructure and Bonding Strength of AZ91/Al Composite Fabricated by Brazing and Hot-Rolling</b><br>L. Yang, D.W. Zhao, Z.L. Zhang, H.L. Shan, L. Yang and Z. Liu                        | 264 |

|                                                                                                                                                                                              |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Effect of ECAP Pass on Corrosion Behavior of High-Al Content Magnesium Alloys</b><br>Q. Fan, W. Liang, L.P. Bian and M.Q. Cheng                                                           | 270 |
| <b>Effect of Processing Speed on Microstructures and Mechanical Properties of Submerged Friction Stir Processed AZ91 Alloy</b><br>F. Chai, D.T. Zhang, W. Zhang and C. Qiu                   | 276 |
| <b>Microstructures and Mechanical Properties of Mg-8Al-1Nd-0.5Zn-xSr Alloys</b><br>B.L. Shi, T.J. Luo, R.D. Liu, X.G. Dong, J. Wang and Y.S. Yang                                            | 282 |
| <b>Microstructure and Mechanical Properties of Mg-6Zn-2Si Alloy Processed by Equal Channel Angular Pressing</b><br>Y. Zhang, F.Y. Han, Y.S. Wang, W. Liang, P. Wang, J.X. You and X.T. Zhong | 289 |
| <b>Biodegradable Behaviors in Simulated Body Fluid of Mg-Gd-Y-Zr Alloy with Micro-Arc Oxide Coating</b><br>K.Y. Yin, T.F. Lu, Q. Dong, B.Y. Sun and B. Chen                                  | 295 |
| <b>Effect of Aging Temperature on Microstructure and Mechanical Properties of AZ81-4%Gd Magnesium Alloy</b><br>Q.Y. Guo, Z. Liu, P.L. Mao and J. Sun                                         | 301 |
| <b>Optimization of Heat Treatment Process on Vacuum Die-Casting AT72 Magnesium Alloy</b><br>D.Q. Li, Y. Liu, J. Xu, S. Shao, C.S. Xu, X.F. Lu and X.J. Yang                                  | 307 |
| <b>Microstructure and Corrosion Resistance of AZ80/Al Composite Plate Fabricated by Friction Stir Processing</b><br>F.C. Liu, Q. Liu, C.P. Huang, K. Yang, C.G. Yang and L.M. Ke             | 313 |
| <b>Hot Deformation Behavior and Microstructural Evolution of Mg-Nd-Zn-Zr Magnesium Alloy</b><br>W.X. Wu, L. Jin, J. Dong, Z.Y. Zhang and W.J. Ding                                           | 320 |
| <b>Fabrication of Carbon Fiber Reinforced Magnesium-Based Composite Laminates by Vibration Assisting Hot Pressing</b><br>S.Y. Liu, J.J. Zhang, W. Liang, L.P. Bian and X.R. Li               | 327 |
| <b>Isochronal Aging Hardening of the Mg-8Gd-3Y-0.5Zr Alloy after Cold Rolling</b><br>Y.C. Xie, D.J. Li, X.Q. Zeng, X. Su, W.J. Ding and B. Chen                                              | 333 |
| <b>Effects of Texture on Tensile Property of Extruded AZ31 Magnesium Alloy Investigated by Acoustic Emission</b><br>C.K. Sun, H.Y. Luo and Z.Y. Han                                          | 340 |
| <b>Study on Interface Characteristics of Al/Mg/Al Composite Plates Fabricated by Two-Pass Hot Rolling</b><br>C.Z. Luo, W. Liang, X.R. Li and Y.J. Yao                                        | 346 |
| <b>Influence of Annealing Temperature on Microstructure and Properties of Warm-Rolled AZ31 Magnesium Alloy Sheets</b><br>H. Zhang, G.S. Huang, J.H. Lin and L.F. Wang                        | 352 |
| <b>Microstructures and Mechanical Properties of ZK60-XHo Wrought Magnesium Alloys</b><br>Z.H. Huang, W.J. Qi and J. Xu                                                                       | 359 |
| <b>Rolling Temperature and Subsequent Annealing on Microstructure, Texture and Mechanical Properties of Consecutive Rolled Mg-2.0Zn-0.8Gd Alloy</b><br>H. Yan, R. Chen and E.H. Han          | 369 |
| <b>Precipitation Behavior and Microstructure Evolution of Mg-Zn-Zr-Er Alloy Processed by Secondary Deformation and Heat Treatment</b><br>B.X. Zhang and J. Zhang                             | 377 |
| <b>Effect of Al<sub>2</sub>Ca Compound on Microstructure of As-Cast AZ31 and AZ61 Alloys</b><br>Q.S. Yang, B. Jiang, X.Y. Huang, X.K. Li and F.S. Pan                                        | 383 |
| <b>Effects of Shrinkage Porosity on Mechanical Properties of a Sand Cast Mg-Y-Re (WE54) Alloy</b><br>J.L. Li, Y.Q. Ma, R. Chen and W. Ke                                                     | 390 |
| <b>Microstructure and Tensile Properties of Mg-4Zn-2Sn-2Al Alloy</b><br>D.Q. Zhao, X.G. Dong, X.E. Zhang, A.J. Gao, J.X. Zhou and Y.S. Yang                                                  | 398 |
| <b>Numerical Simulation Research on Wide Casting Nozzle of Twin-Roll Magnesium Alloy</b><br>X.P. Liang, S.S. Liao, L. Xiao and B. Jiang                                                      | 404 |
| <b>Temperature Field and Cast-Rolling Force Prediction during Horizontal Twin-Roll Casting Magnesium Alloy</b><br>X.P. Liang, L. Xiao, S.S. Liao and B. Jiang                                | 412 |

|                                                                                                                                                   |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Microstructure and Kinetics of <math>\beta</math>-Mg<sub>17</sub>Al<sub>12</sub> Phase Transformation for Warm Rolled AZ91 Magnesium Alloy</b> |     |
| L. Yang, J.D. Wang, S.N. Wang, L. Lin and Z. Liu                                                                                                  | 421 |
| <b>Microstructure and Mechanical Properties of Backward-Extruded Mg-Zn-xCa Biomaterials</b>                                                       |     |
| X.J. Li, H. Li, S.S. Zhao, N. Ma and Q.M. Peng                                                                                                    | 426 |
| <b>Metal Flow Behaviour in Tee Joint Valve Body Multidirectional Extrusion</b>                                                                    |     |
| M. Cheng and Z.M. Zhang                                                                                                                           | 431 |
| <b>Corrosion and Electrochemical Behaviors of As-Cast Mg-8Y and Mg-5Y-7Gd-1Nd-0.5Zr Magnesium Alloys in NaCl Aqueous Solution</b>                 |     |
| X. Zhang, X. Deng, K. Zhang, X.G. Li, Y. Shi, Y.L. Zhang, M. Peng and L.Y. Kong                                                                   | 437 |
| <b>Microstructure and Mechanical Properties of Extruded Mg-Zn-Y Alloy</b>                                                                         |     |
| F. Wang, J.B. Li, P.L. Mao and Z. Liu                                                                                                             | 443 |
| <b>Effects of Solid Solution Treatments on Microstructures and Tensile Properties of a Mg-Y-Zn-Cu Alloy</b>                                       |     |
| B.Q. Shi, R. Chen and W. Ke                                                                                                                       | 449 |
| <b>Microstructure and Mechanical Properties of Extruded AZ31 Profile with High Performance</b>                                                    |     |
| B.Y. Yu, T.J. Gao, Q. Li, Y.J. Wu and R.X. Li                                                                                                     | 457 |
| <b>Analysis of Factors Influencing CPU Heat Dissipation of Porous Magnesium</b>                                                                   |     |
| L.C. Wang, Y.L. Wang and C.X. Wang                                                                                                                | 463 |
| <b>Influences of Al, Ce on the Microstructure and Mechanical Properties of As-Cast Mg-6Zn Alloy</b>                                               |     |
| R.D. Liu, X.G. Dong, F.J. Wei and Y.S. Yang                                                                                                       | 470 |
| <b>Superalloys</b>                                                                                                                                |     |
| <b>Tensile Properties of a Low-Cost First Generation Single Crystal Superalloy DD16</b>                                                           |     |
| J.W. Xu, Y.S. Zhao and D.Z. Tang                                                                                                                  | 478 |
| <b>Effects of Coating on Surface Recrystallization of DD6 Single Crystal Blades</b>                                                               |     |
| Y.L. Jia, Y.S. Zhao, Y.S. Luo, S. Yang, J.W. Xu and D.Z. Tang                                                                                     | 483 |
| <b>Mechanical Properties and Deformation Texture of GH536 Superalloy Strip</b>                                                                    |     |
| C.L. Jia, Q. Fan, Y. Wang, Y.Y. Zhang and Q. Li                                                                                                   | 489 |
| <b>Effect of Heat Treatment on the Microstructure and Property of TiAl Alloys Prepared by Gas Atomization Powders</b>                             |     |
| N. Liu, Z. Li, G.Q. Zhang, H. Yuan, W.Y. Xu and Z.J. Gao                                                                                          | 497 |
| <b>Effect of Salt-Coating Hot Corrosion on Stress-Rupture Properties of a Corrosion Resistant Directionally Solidified Superalloy</b>             |     |
| X.D. Chen, Q. Li, C.B. Xiao and W.P. Ren                                                                                                          | 502 |
| <b>Effects of Consolidation Process on the Microstructure and Mechanical Properties of ODS Ferritic Alloy</b>                                     |     |
| T. Liu, H.L. Shen, T.W. Zhang, M. Zhu and C.G. Qin                                                                                                | 507 |
| <b>Evaluation of Inclusions in P/M Superalloy</b>                                                                                                 |     |
| H. Yuan, Z. Li, G.Q. Zhang, W.Y. Xu and N. Liu                                                                                                    | 513 |
| <b>Surface Segregation and Oxidation Behavior of Superalloy Powders Fabricated by Argon Atomization</b>                                           |     |
| Z.J. Gao, G.Q. Zhang, Z. Li, H. Yuan, W.Y. Xu and Y. Zhang                                                                                        | 518 |
| <b>Detection and Deformation Mechanism of Non-Metallic Inclusions in FGH96 Alloy Isothermal Forging Disk</b>                                      |     |
| X.F. Wang, X.M. Zhou, J. Yang, J.W. Zou and W.X. Wang                                                                                             | 526 |
| <b>Formation of Stray Grains in Directionally Solidified Ni-Based Superalloy with Cross-Section Change Regions</b>                                |     |
| W.D. Xuan, Z.M. Ren, H. Liu and T.S. Tu                                                                                                           | 535 |
| <b>Microstructure and Hot Tearing Susceptibility of K418 and K419 Superalloy for Auto Turbocharger Turbine Wheel</b>                              |     |
| Z.X. Shi, J.X. Dong and M.C. Zhang                                                                                                                | 540 |
| <b>Effect of Solid Solution Heat Treatment on Microstructures of the Third Generation Single Crystal Superalloy DD9</b>                           |     |
| X.G. Wang, J.R. Li, Z.X. Shi and S.Z. Liu                                                                                                         | 549 |

|                                                                                                                                                                                                 |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>A New Deformation Region and How Low Do You Go? – "Intrinsic Deformation Limit"</b><br>J.J. Shen, K. Ikeda, S. Hata and H. Nakashima                                                         | 559 |
| <b>Quantitative Analysis on Fatigue Fracture of Spray Formed GH738 Alloy</b><br>D.Y. Yang, W.Y. Xu, Z. Li, G.Q. Zhang, Z.L. Ning and J.F. Sun                                                   | 564 |
| <b>Constitutive Characteristic of Hot Deformation for Spray Formed Superalloy GH738</b><br>Y. Wang, Z. Li, W.Y. Xu, H. Yuan, N. Liu, Z.J. Gao, S.F. Tian and G.Q. Zhang                         | 569 |
| <b>Preparation and Oxidation Behaviour of an Al-Si Coating on a Ni<sub>3</sub>Al Based Single Crystal Superalloy IC21</b><br>Y.Z. Liu, Q. Wu, S.S. Li, Y. Ma and S.K. Gong                      | 575 |
| <b>Effect of Cr and Re on the Oxidation Resistance of Ni<sub>3</sub>Al-Base Single Crystal Alloy IC21 at 1100</b><br>X.J. Xu, Q. Wu, S.K. Gong and S.S. Li                                      | 582 |
| <b>Microstructure Evolution and Processing Map of Superalloy GH720Li during Isothermal Compression</b><br>Z. Li, S.H. Fu, T. Wang, Y.X. Zhao, Y. Zhang and M.C. Zhang                           | 588 |
| <b>Superalloys and the Development of Advanced Ultra-Supercritical Power Plants</b><br>X.S. Xie, C.Y. Chi, S.Q. Zhao, J.X. Dong and F.S. Lin                                                    | 594 |
| <b>Improvement in Oxidation Resistance of Ni<sub>3</sub>Al Based Single Crystal Superalloy IC32 by NiAlHfSi Coating</b><br>P.C. Dai, H. Peng, Y.L. Pei, Y. Ma, S.S. Li and S.K. Gong            | 604 |
| <b>Influence of Annealing Time on Microstructure of Ni-W Alloys</b><br>Q. Zhang, S.H. Liang, C. Zhang and J.T. Zou                                                                              | 613 |
| <b>Preparation of Oxide Dispersion Strengthened Fe by Co-Precipitation</b><br>Z.M. Guo, W.W. Yang, J. Luo and X. Yu                                                                             | 619 |
| <b>Influence of Withdrawal Rate on Tensile and Stress Rupture Properties of the Single Crystal Superalloy DD9</b><br>Z.X. Shi, J.R. Li and S.Z. Liu                                             | 625 |
| <b>Effects of Nb/Ti Ratio on the Microstructures of Two Experimental Ni-Based Cast Superalloys</b><br>W. Sun, X.Z. Qin, W. Wang, T.T. Wang, Y.A. Guo, J.T. Guo, L.H. Lou and L.Z. Zhou          | 629 |
| <b>Microstructure and Mechanical Properties of 9Cr-ODS Ferritic/Martensitic Steels by Mechanically Alloyed and Spark Plasma Sintering</b><br>J. Yang, Z.M. Guo, W.W. Yang, J. Luo and C.G. Chen | 636 |
| <b>Self-Propagating Combustion Synthesis and Characterization of ODS Fe-Base Superalloy Powders</b><br>C.G. Chen, Z.M. Guo, J. Luo, W.W. Yang, J.J. Hao and J. Yang                             | 641 |
| <b>Stability of Microstructure and Mechanical Properties of GH984G Alloy during Long-Term Thermal Exposure</b><br>T.T. Wang, C.S. Wang, J.T. Guo and L.Z. Zhou                                  | 647 |
| <b>Thermodynamic Description of the <math>\gamma'</math> Phase in the Co-Al-W Based Superalloys</b><br>S.Y. Yang, M. Jiang and L. Wang                                                          | 654 |
| <b>Influence of Ageing Treatments on Stress Rupture Properties of Ni<sub>3</sub>Al-Base Single-Crystal Alloy IC21 at 850°C</b><br>H. Li, F.L. Li, S.S. Li, H. Zhang and S.K. Gong               | 659 |
| <b>Heat Treatment of a Ni<sub>3</sub>Al-Based Single Crystal Alloy IC32</b><br>D.L. Cui, X.Y. Xie, S.S. Li, H. Zhang and S.K. Gong                                                              | 665 |
| <b>Influence of Phosphorus and Boron on Creep Behavior and Fracture Mechanism of GH4169 Superalloy</b><br>S.G. Tian, X. Wang, C. Liu and W.R. Sun                                               | 672 |
| <b>Effects of Long-Term Aging Treatment on Stress Rupture Properties of FGH95 Ni-Base Superalloy</b><br>S.G. Tian, G.L. Xie, J. Xie and X.M. Zhou                                               | 678 |
| <b>Effects of Long-Term Aging Treatment on Stress Rupture Properties of FGH95 Ni-Base Superalloy</b><br>S.G. Tian, G.L. Xie, J. Xie and X.M. Zhou                                               | 684 |
| <b>Influence of Solution Temperature on Compositions Segregation and Creep Behavior of a Single Crystal Nickel-Based Superalloy</b><br>S.G. Tian, Y.C. Xue and Z. Zeng                          | 690 |

|                                                                                                                                                                                          |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Microstructure and Creep Property of DZ125 Nickel-Based Superalloy</b><br>S.G. Tian, X.L. Meng, N. Tian and H.C. Yu                                                                   | 697 |
| <b>Thermal Deformation Behavior and Constitutive Equation of Highly Alloyed Superalloy Udimet720Li</b><br>T. Wang, S.H. Fu, Z. Li, Y. Zhang, Y.X. Zhao and L. Guo                        | 703 |
| <b>Study on the Properties of Spray Formed Tool-Die Steel</b><br>Y. Zhang, G.Q. Zhang, Z. Li and X.L. Ni                                                                                 | 709 |
| <b>The Influence of the Re-Melting Times on Microstructure and Mechanical Properties for Revert Alloy K452</b><br>C. Yuan, J.T. Guo, C.J. Liu, J.S. Hou and G.S. Li                      | 715 |
| <b>Stress Corrosion Cracking (SCC) of Nickel-Base Weld Metals in PWR Primary Water</b><br>R. Xiong, Y.J. Qiao and G.L. Liu                                                               | 723 |
| <b>Effect of Alloy States on the Recrystallization Behavior in Single Crystal Superalloy</b><br>L.R. Liu, J.S. Huang and G.Q. Zu                                                         | 733 |
| <b>Atomic Interchange Potentials Calculation of Ni-Al-Cr Alloy Based on Microscopic Phase Field Method</b><br>W.P. Dong, Z. Jing and Z. Chen                                             | 739 |
| <b>Mechanical Properties and Microstructure of Nb/Nb5Si3/Cr2Nb Alloys Prepared by Spark Plasma Sintering</b><br>W. Zong, W. Liu and J.B. Sha                                             | 747 |
| <b>Effect of Mo on the High Temperature Oxidation Behavior of Co-Al-W Based Alloys</b><br>F. Fan, H. Sun, D. Zhao and J.B. Sha                                                           | 754 |
| <b>Precipitation and Dissolution Behavior of <math>\delta</math> Phase in Alloy GH4169G</b><br>F. Liu, L.X. Yu, L.T. Chang, X. Xin, W.H. Zhang, D. Jia, F. Qi and S.C. Li                | 760 |
| <b>Interaction between Two Ni-Base Alloys and Ceramic Moulds</b><br>J.S. Yao, D.Z. Tang, X.G. Liu, C.B. Xiao, X. Li and C.X. Cao                                                         | 765 |
| <b>Effect of Hot Isostatic Pressing on the Microstructure of Single Crystal Ni-Based Superalloy DD10</b><br>L.J. Liu, M. Xue, J.Y. Chen and L.M. Cao                                     | 772 |
| <b>Effects of Ruthenium on Microstructure and Stress Rupture Properties of a Nickel-Base Single Crystal Superalloy</b><br>S. Yang, J. Zhang, Y.S. Luo, Y.S. Zhao, D.Z. Tang and G.Q. Cao | 777 |
| <b>Research on Gradient Heat Treatment of Dual-Property Disk for Alloy FGH96</b><br>Y. Wang, J.W. Zou, G.Q. Zhang and W.X. Wang                                                          | 783 |
| <b>Effects of Dy on the Microstructure and Hardness of NiAl Alloys</b><br>Z.Y. Zhang, H.B. Guo, H. Peng, S.K. Gong and H.B. Xu                                                           | 788 |
| <b>Grain Competition Mechanism of a Ni<sub>3</sub>Al-Based Single Crystal Superalloy IC6SX</b><br>L.W. Jiang, S.S. Li, M.L. Wu and Y.F. Han                                              | 797 |
| <b>Investigation on Creep Mechanism of a Ni<sub>3</sub>Al-Based Single Crystal Superalloy IC6SX under 760°C/540MPa</b><br>L.W. Jiang, S.S. Li and M.L. Wu                                | 804 |

## **Advanced Titanium Alloys**

|                                                                                                                                                                          |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>Effect of a Strong Magnetic Field on Dendritic Growth of Ti-Ni Alloy</b><br>H. Chang, C.L. Huang, B. Tang, R. Hu, J.S. Li and H. Zhong                                | 810 |
| <b>Preliminary Research on a New Ultra-High Strength Titanium Alloy</b><br>H.L. Qu, Y.Q. Zhao, Z.S. Zhu, H. Li, L. Feng, L. Zhou and M.Q. Li                             | 818 |
| <b>Research on Effects of Uneven Macrostructure to Mechanical Properties in TC21 Forging</b><br>J. Li, Z.S. Zhu, X.N. Wang, Y. Fei, G.Q. Shang and L.W. Zhu              | 823 |
| <b>Quantification and Statistical Analysis of Microstructural Features in As-Cast Ti-6Al-4V Titanium Alloy</b><br>X.J. Cheng, G.Q. Wu and J.Q. Zhao                      | 828 |
| <b>Relationship between Intragranular <math>\alpha</math> Phase Width and Microhardness of TC18 Titanium Alloy</b><br>H.H. Li, G.Q. Wu, C.L. Shi and A.X. Sha            | 833 |
| <b>Relationships between Spring-Back and Microstructure of Ti-15V-3Cr-3Sn-3Al Titanium Alloy Sheet during Bending Process</b><br>L.L. Li, G.Q. Wu, C.X. Liu and A.X. Sha | 839 |

|                                                                                                                                                                                                                           |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b><math>\beta</math> Grain Growth Kinetics of a New Metastable <math>\beta</math> Titanium Alloy</b><br>Y. Fei, X.N. Wang, Z.S. Zhu, J. Li, G.Q. Shang and L.W. Zhu                                                      | 844 |
| <b>Research on TC4 Alloy Wire Rod Straightening Process</b><br>J.C. Feng, M.H. Chen, C. Zhang and L.M. Guo                                                                                                                | 850 |
| <b>Phase Transformation Behavior and Mechanical Properties of Ti-Mo-Sn Alloys</b><br>X.X. Chen, S. Guo and X.Q. Zhao                                                                                                      | 855 |
| <b>Microstructural Evolutions of a High Temperature Titanium Alloy Processed by Thermal Mechanical Treatments</b><br>T. Wang, H.Z. Guo, Z.K. Yao, Z.L. Zhao, S.H. Fu and Y. Zhang                                         | 860 |
| <b>Effect of Sputtering Current on Growth and Microstructure for Titanium Alloy Coatings onto SiC</b><br>H. Huang, M. Wen, M.J. Wang, Z.X. Li, X. Huang and C. Xie                                                        | 866 |
| <b>Study on Combustion Behavior of TC4 and Ti40 Alloys</b><br>M.Y. Huang, S.W. Xin, J.H. Ju, Y.F. Lu, Q. Li, Y.Q. Zhao and B. Wang                                                                                        | 872 |
| <b>Analysis of Hot Deformation Dynamics of TC18 Titanium Alloy</b><br>Q.R. Wang, A.X. Sha, X.W. Li and L.J. Huang                                                                                                         | 878 |
| <b>Designing Multi-Component <math>\beta</math>-Ti Alloys with Low Young's Modulus</b><br>Q. Wang, X.D. Zhang, X.N. Li, C.J. Ji and C. Dong                                                                               | 885 |
| <b>Effect of Nb on the Properties of Ti-Nb Random Alloys from First-Principles</b><br>M.J. Lai, X.Y. Xue, C.S. Meng, H.C. Kou, B. Tang, H. Chang and J.S. Li                                                              | 890 |
| <b>The Effect of Cryogenic Treatment on the Microstructure and Properties of Ti-6Al-4V Titanium Alloy</b><br>K.X. Gu, Z.Q. Li, J.J. Wang, Y. Zhou, H. Zhang, B. Zhao and W. Ji                                            | 899 |
| <b>Phase Transformation and Microstructure Evolution in Near-<math>\beta</math> Ti-7333 Titanium Alloy during Aging</b><br>Q. Hui, X.Y. Xue, H.C. Kou, M.J. Lai, B. Tang and J.S. Li                                      | 904 |
| <b>Microstructural Evolution and Precipitation Mechanism of <math>\alpha</math>-Phase in Ti-55531 Alloy Aged at High Temperature</b><br>X. Zhang, Y. Chen, F.S. Zhang, J.T. Yang, Y.J. Lai, H.C. Kou, J.S. Li and L. Zhou | 912 |
| <b>Experimental Study on Heat Treatment Processing of a New Low Cost Titanium Alloy Used in Aviation Field</b><br>G.Q. Shang, X.N. Wang, Y. Fei, J. Li, Z.S. Zhu and L.W. Zhu                                             | 919 |
| <b>Microstructure and Tensile Properties of 1-D Forged (TiB+TiC)/Ti Composite</b><br>C.J. Zhang, F.T. Kong, S.L. Xiao, L.J. Xu, Y. Chen, N.J. Deng, W. Ge and G.J. Xu                                                     | 926 |
| <b>Microstructure and Property of a New Metastable <math>\beta</math> Titanium Alloy</b><br>X.N. Wang, Y. Fei, X.H. Zhou, Z.S. Zhu, J. Li, G.Q. Shang and L.W. Zhu                                                        | 932 |
| <b>Research on Precision Forming Technology of Titanium Alloy Sheet Metal Based on the Principle of the Stress Relaxation</b><br>M.H. Chen, L.S. Xie and L. Liu                                                           | 937 |
| <b><math>\beta</math> Stability and Mechanical Behavior of Metastable <math>\beta</math> Type TiNb Based Alloys</b><br>G.Y. Liao, S. Guo, Z.Z. Bao and X.Q. Zhao                                                          | 941 |