

TABLE OF CONTENTS

Pt. I

Preface M. Koiwa

I. Keynote Lectures

| | | |
|---|--------------------|----|
| Challenges of Paradigm Building for Solid-State Transformations. . . | <i>J. W. Cahn</i> | 3 |
| A New Evaluation Method of Phase Decomposition by Utilizing the Macroscopic Composition Gradient in Alloys. | <i>T. Miyazaki</i> | 15 |

II. Diffusional Transformations

2.1. Order-Disorder Transformations

| | | |
|--|---|----|
| *The Measurement and Prediction of Order | <i>I. P. Jones, N. Jiang, J. N. Pratt, R. E. Smallman, D. H. Hou, H. L. Fraser, P. Shang, G. Yang and J. S. Abell</i> | 25 |
| Ordering and Ordered Structures in the β Phase of Ag-Zn-Al Alloys | <i>K. Takezawa, H. Hoshi and K. Marukawa</i> | 33 |
| Order and Disorder in Ag-Rich Ag-Al Single Crystals. | <i>S.-Y. Yu, B. Schönfeld and G. Kostorz</i> | 37 |
| <i>In Situ</i> Metallography of Order-Disorder Transformation in CuAu | <i>V. Šíma, P. Mašek, F. Chmelík, A. Brinck, H. Neuhäuser, B. Sprušil and W. Pfeiler</i> | 41 |
| X-ray Study of the Order-Disorder Transition in Alloys with Long Period. | <i>S. V. Starenchenko and E. V. Kozlov</i> | 45 |
| <i>In-Situ</i> TEM Observation of Long Range Ordering and Disorder Process via Short Range Order in Cu-Al. | <i>M. Hama, N. Chiwata, N. Kuwano and K. Oki</i> | 49 |
| B2-Ordered Intermetallic FeAl: Changes in the Degree of LRO. | <i>K. Rohrhofer, H. Lang, W. Püschl and W. Pfeiler</i> | 53 |

2.2. Phase Separation and Ordering

| | | |
|---|---|----|
| Transmission Electron Microscope Study of the Non-Equilibrium α - γ Phase Transformations in Ti-Al Intermetallic Alloys | <i>E. Abe, K. Niinobe, T. Kumagai, M. Nakamura and T. Tsujimoto</i> | 57 |
| A New Concept of the A2/B2 Phase Transformations Based upon Recent Experimental Investigations. | <i>A. M. Mebed, T. Koyama and T. Miyazaki</i> | 61 |
| *Ordering and Phase Separation in Model Superalloys: 3D Atom Probe versus Monte Carlo Simulation. | <i>D. Blavette, F. Soisson, G. Martin and C. Pareige</i> | 65 |
| Atom Probe Studies of Phase Transformations in Nickel-Based Superalloys | <i>M. K. Miller</i> | 73 |
| Analysis of the Evolution of Domain Structures by Multi-Dimensional Order Parameters. | <i>R. Oguma and T. G. Eguchi</i> | 77 |

*invited paper

| | |
|---|----|
| Giant Magnetoresistance and Spinodal Decomposition in Co-Cu Ribbons | 81 |
| <i>Z.-J. Kim, J. Echigoya and K. Fukamichi</i> | |
| Comparison of SRO-Kinetics in Deformed and Recrystallized State. | 85 |
| <i>M. Spanl, P. Rosenkranz, W. Püschl and W. Pfeiler</i> | |
| A Mathematical Model of Heterogeneous Reaction | 89 |
| <i>K. Holly, M. Danielewski and B. Bozek</i> | |
| Self-Assembly in Mixtures of Diblock Copolymer and Homopolymer | 93 |
| <i>M. Takenaka, N. Zizuka, H. Hasegawa and T. Hashimoto</i> | |

2.3. Phase Decomposition

| | |
|---|-----|
| *Clustering and Segregation of Mg and Ag Atoms during the Precipitation Processes in Al-(Li)-Cu-Mg-Ag Alloys. | 97 |
| <i>K. Hono, M. Murayama and L. Reich</i> | |
| *Coherency Strain in Two Dimensions; Effects on Phase Equilibria, Diffusion and Phase Transformations in Multicomponent Systems | 105 |
| <i>G. R. Purdy, A. E. Holm and Y. Wang</i> | |
| Decomposition Behaviour of γ_{Mn} Phase in MnCu and MnCuNiFe Alloys during Aging within the Miscibility Gap. | 113 |
| <i>F. Yin, Y. Ohsawa, A. Sato and K. Kawahara</i> | |
| Kinetics of Spinodal Decomposition with Composition Dependent Mobility | 117 |
| <i>T. Ujihara and K. Osamura</i> | |
| Kinetics of Nucleation-Growth Processes: The First Stages. | 121 |
| <i>J. W. P. Schmelzer and V. V. Slezov</i> | |
| Evaluation of Phase Decomposition and Precipitation in an Al-Mg ₂ Si Alloy by Quantitative Measurement of Dislocation-Defect Interactions | 125 |
| <i>B. J. Diak and S. Saimoto</i> | |
| Morphology and Crystallography of Triple Point Nucleated Precipitate in Two Phase Alloys. | 129 |
| <i>H. Fujiwara, T. Maeda and K. Ameyama</i> | |
| Far from Equilibrium Primary Crystallization Kinetics for Nano-Structural Development. | 133 |
| <i>N. Clavaguera and M. T. Clavaguera-Mora</i> | |
| Phase Decomposition in Al-Ag Alloys under Deformation. | 137 |
| <i>H. Okuda, H. Suzuki, H. Hiramatsu, K. Zto, K. Osamura and Y. Amemiya</i> | |
| Characterization of γ Plate-Shaped Precipitates during Early Stages of Growth in an Al-4.2 at.%Ag Alloy: Solute Field, Composition and Growth Kinetics | 141 |
| <i>K.T. Moore and J. M. Howe</i> | |
| The Modelling of the Heterogeneous Precipitation in Al-Zn-Mg-Cu Alloys during Quenching. | 145 |
| <i>D. Godard, E. Gautier, P. Archambault and C. Sigli</i> | |
| Kinetics of the $\alpha \rightarrow \gamma$ Transformation in Ti-(46-48)at.%Al Alloys | 149 |
| <i>D. Veeraraghavan, P. Wang, U. Pilchowski and V. K. Vasudevan</i> | |
| Decomposition of α -phase into Massive and Widmanstätten Structures in a Ti-48 at. % Al Alloy. | 153 |
| <i>K. Nakai and Y. Ohmori</i> | |
| The Role of Microalloying Elements in the Formation of Precipitate Plates in Aluminium Alloys. | 157 |
| <i>J. F. Nie, H. I. Aaronson and B. C. Muddle</i> | |
| Role of Microalloying Elements in Phase Decomposition of Al Based Alloys. | 161 |
| <i>T. Sato, S. Hirosawa and A. Kamio</i> | |

*invited paper

| | | |
|--|--|-----|
| The Solute Clustering and Precipitation in Two-Step Aged Al-Mg-Si Alloys | <i>M. Murayama and K. Hono</i> | 165 |
| Effects of Si and Ag on Precipitation in Al-Cu-Mg Alloys | <i>C. R. Hutchinson, K. Raviprasad and S. P. Ringer</i> | 169 |
| Effects of Deformation on Precipitation in Al-Fe Dilute Alloys. | <i>A. Yamamoto, H. Tsubakino and T. Kato</i> | 173 |
| Coarsening Behavior of Cr Precipitates in B2-Ordered NiAl | <i>K. Oh-ishi, E. Tsutsumi, Z. Horita and M. Nemoto</i> | 177 |
| Coarsening of Coherent Precipitates in a Solid Matrix | <i>H. A. Calderon, J. J. Cruz, L. Calzado, T. Mori, C. Kisielowski and C. Y. Wang</i> | 181 |
| *Precipitation Reactions in Two Magnesium Alloys Containing Rare Earths | <i>G. Lorimer, R. A. Khosroshahi and M. Ahmed</i> | 185 |
| Discontinuous Precipitation in Pb-Sn and Pb-Sn-Ag Alloys. | <i>M. R. Notis</i> | 193 |
| Formation of Lamellar Structure and its Mechanical Properties in Mo-Al Alloys | <i>R. Nino, S. Miura and T. Mohri</i> | 197 |
| Crystallography of Cementite in Tempered Fe-Ni-C Alloys | <i>E. V. Pereloma, I. B. Timokhina and S. P. Swenser</i> | 201 |
| Observation of Precipitates in Al-Mg-Si-Cu Alloy by High Resolution Transmission Electron Microscopy | <i>I. Okumura, K. Matsuda, Y. Uetani, F. Shinagawa and S. Ikeno</i> | 205 |
| HRTEM Observation of the Precipitates in Two-Step Aged Al-1.0mass%Mg ₂ Si- 0.4mass%Si Alloy. | <i>K. Matsuda, T. Kawabata, Y. Uetani, T. Sato, A. Kamio, F. Shinagawa and S. Ikeno</i> | 209 |
| Morphological Evolution of γ_2 Precipitates in a β Cu-Al Matrix | <i>H. Goldenstein and I. G. S. Falleiros</i> | 213 |
| Effects of Nucleation on Phase Separation Dynamics in Metastable States | <i>Y. Enomoto</i> | 217 |
| Isothermal Precipitation in a β CuZnAl SM Alloy. | <i>M. L. Castro and R. Romero</i> | 221 |
| Heterogeneous Nucleation of Precipitate Phase θ' in Microalloyed Al-Cu Based Alloys. | <i>X. Gao, J. F. Nie and B. C. Muddle</i> | 225 |
| The Observation of Phase Transformation by HDDR Process in Sm-Fe-B-Ti System | <i>Z. Liu, T. Ohsuna, K. Hiraga and M. Tobise</i> | 229 |
| Effect of Intermediate Argon Treatment on Microstructure and Anisotropy of HDDR- Treated Nd-Fe-B-Based Alloy Powders. | <i>M. Ztakura, K. Mishima, M. Eshima, N. Kuwano, K. Oki, R. Nakayama, Y. Zshii and K. Morimoto</i> | 233 |
| The Role of Pretransitions in Allotropic Transformations. | <i>R. Tognato</i> | 237 |
| Correlation between the Evolution of Thermoelectric Power and the Microstructural Transformations Occuring during the Ageing of a 6061 Alloy | <i>V. Massardier, T. Epicier and P. Merle</i> | 241 |
| Analysis of Phase Decomposition during Annealing in the Nb-Zr System Using the System Free Energy Theory. | <i>Y. Toda, T. Koyama and T. Miyazaki</i> | 245 |
| r-Phase Formation Mechanism of Rapidly-Solidified Mn-Al-C Alloy | <i>J. H. Kim, C. T. Lee and W. K. Choo</i> | 249 |

*invited paper

| | |
|--|-----|
| Precipitation in a Cu-15 wt. % Ni-8 wt. % Sn Alloy | 253 |
| <i>V. M. López-Hirata, Á. de Jesús Arias-Pérez and M. L. Saucedo-Muñoz</i> | |
| Time-Resolved SWAXS on Phase Decomposition with Ordering | 257 |
| <i>H. Okuda, K. Zto, K. Osamura and Y. Amemiya</i> | |
| A Study of Phase Transformations in a Zn-22 wt. % Al-2 wt. % Cu Alloy. | 261 |
| <i>H. J. Dorantes-Rosales, V. M. Lopez-Hirata and Y. H. Zhu</i> | |
| Phase Transformations in Ti-44Al-11Nb. | 265 |
| <i>E. S. K. Menon, T. R. Halladay, A. G. Fox and R. Mahapatra</i> | |
| Precipitation Behavior of T' Metastable Phase in Al-Zn-Mg Based Alloys | 269 |
| <i>H. Adachi, K. Osamura, H. Okuda, K. Yokoe and J. Kusui</i> | |
| Peritectic Structures in Copper-Germanium Alloy Rod Pulled from the Melt. | 273 |
| <i>Y. Imashimizu, J. Watanabe' and M. Mohammad</i> | |
| Control of Microstructures by Heat Treatments and Creep-Rupture Properties in High-Tungsten Cobalt-Base Superalloys. | 277 |
| <i>M. Tanaka, Y. Ito and R. Kato</i> | |
| <i>In-Situ</i> Observation of the Combustion Phase Transformation in a Mechanical Alloyed Ti-Al Powder Mixtures | 281 |
| <i>C. E. Wen, K. Yasue, J. G. Lin and Y. G. Zhang</i> | |
| Diffusional Phase Transformation of Massive γ in a Quenched TiAl Alloy. | 285 |
| <i>C. E. Wen, K. Yasue, S. Q. Wei, J. G. Lin and C. Q. Chen</i> | |
| Evolution in Microstructure and Superplastic Flow at High-Strain-Rate in Dynamically Recrystallized Aluminum Alloy | 289 |
| <i>T. Hirata, T. Mukai, N. Saito, M. Kohzu, S. Tanabe and K. Higashi</i> | |
| Formation of α Phase from Ti-10V-2Fe-3Al Alloy Containing ω Precipitates | 293 |
| <i>A. Yamamoto and H. Tsubakino</i> | |
| Variation in Mushy Zone Length during Upward Directional Solidification in Pb-36-mass%Sn Alloy. | 297 |
| <i>M. Li, H. Iwasaki and T. Mori</i> | |
| Structure of Platelet Oxide Precipitates in Si Wafers | 301 |
| <i>Y. Tomokiyo, K. Mori, E. Tanaka and T. Okuyama</i> | |

2.4. High Resolution Study of Phase Transformations

| | |
|---|-----|
| *Coherent Precipitation in Ni-Rich Ni-Ti Single Crystals | 305 |
| <i>G. Kostorz, M. Kompatscher and B. Schönfeld</i> | |
| Energy Filtering HRTEM Study of Equilibrium Mg ₂ Si Phase in Al-Mg-Si Alloys | 313 |
| <i>K. Matsuda, T. Naoi, Y. Uetani, T. Sato, A. Kamio and S. Zkeno</i> | |
| X-ray Diffraction Study of Carburization Transformation from Tantalum to Tantalum Carbide. | 317 |
| <i>F. Watari, M. Takahashi and K. Yada</i> | |
| Time-Resolved HREM of Metal-Mediated Crystallization of Amorphous Germanium Films. | 321 |
| <i>N. Tanaka and M. Kawahara</i> | |
| Relation between Micro- and Magnetic-Structures of Iron-Platinum Alloys | 325 |
| <i>Y. Tanaka, K. Udoh, K. Hisatsune, M. Nakano and H. Fukunaga</i> | |
| Quantitative Analysis of L1 ₀ -Ordered States in Ti-Al-Mo Ternary Alloys by IKL-ALCHEMI-EDX Method | 329 |
| <i>S. Hata, Y. Fujimoto, T. Narahara, N. Kuwano and K. Oki</i> | |

*invited paper

| | |
|---|-----|
| Structures of Short Range Order in FCC-Based Ni-Mo Studied by HREM with Image Processing. | 333 |
| <i>T. Mitate, S. Hata, N. Kuwano, S. Matsumura, D. Shindo and K. Oki</i> | |

2.5. Effect of External Field to Phase Transformations

| | |
|--|-----|
| A Mechanism for Directional Coarsening of γ' Precipitates in Nickel-base Single Crystal Superalloys | 337 |
| <i>Z. Peng, Y. Ren, B. Fan, Q. Mei, P. Yan, J. Zhao, Y. Wang and J. Sun</i> | |
| Mechanical Properties of Porous Copper Fabricated by Unidirectional Solidification under High Pressure Hydrogen. | 341 |
| <i>S. K. Hyun, Y. Shiota, K. Murakami and H. Nakajima</i> | |
| Shock Induced Transformation in Rapidly Solidified Ti-Rich TiAl Powders | 345 |
| <i>M. Nishida, Y. Morizono, T. Matsuda and A. Chiba</i> | |
| The Deformation-Induced Order-Disorder Phase Transformation. | 349 |
| <i>S. V. Starenchenko and V. A. Starenchenko</i> | |
| Shock Induced Regularization to Refractory Metal Di-Silicides from MA Precursor | 353 |
| <i>T. Aizawa</i> | |
| Effect of Pressure on Metamagnetic Transition of Magnetic Superconductor $\text{HoNi}_2\text{B}_2\text{C}$ | 357 |
| <i>G. Oomi, N. Matsuda, T. Kagayama, Y. Uwatoko, B. K. Cho and P. C. Canfield</i> | |
| Study on the Sonochemical Preparation and Phase Stability of Binary Alloy Nanoparticles from Aqueous Solution. | 361 |
| <i>T. Fujimoto, Y. Mizukoshi, Y. Maeda, Y. Nagata and R. Oshima</i> | |
| Martensitic Transformation of the γ Iron-Nitride Induced by External Magnetic Field | 365 |
| <i>T. Koyano, H. Zkeda, R. Yoshizaki, A. Tasaki, T. Takamasu, H. Ohtsuka, H. Wada, G. Kido and T. Ohba</i> | |
| Pressure and Magnetic Field Induced Metal-Insulator Transition in $\text{Eu}_{0.58}\text{Sr}_{0.42}\text{MnO}_3$ | 369 |
| <i>I. Kosaka, F. Honda, T. Kagayama, G. Oomi, E. V. Sampathkumaran and A. Sundaresan</i> | |
| Effect of Pressure on the Metamagnetic Phase Transition of UCoAl | 373 |
| <i>F. Honda, T. Kagayama, G. Oomi, V. Sechovsky, L. Havela, A. V. Andreev and Y. Shiokawa</i> | |
| Magnetic and Structural Phase Transformations in DyB_6 under High Pressure | 377 |
| <i>T. Sakai, G. Oomi and S. Kunii</i> | |
| Stability of Intermediate ζ Phase in the Silver-Germanium System under High Pressure | 381 |
| <i>Y. Fujinaga</i> | |
| Effect of Applied Stress on Ordering of FePd | 385 |
| <i>T. Ichitsubo, K. Tanaka, M. Nakamoto, T. Miyoshi and M. Koiwa</i> | |
| Formation of Preferentially Oriented Structure of Ordered FePd under External Stress. | 389 |
| <i>T. Ichitsubo, K. Tanaka, M. Nakamoto and M. Koiwa</i> | |
| Effects of High Magnetic Field on Diffusional Transformation Behavior and Structure. | 393 |
| <i>H. Ohtsuka, Y. Xu, J.-K. Choi, Y. Oishi, T. Murai and H. Wada</i> | |

*invited paper

2.6. Effect of Irradiation to Phase Transformations

| | | |
|---|---|-----|
| Irradiation-Induced Roughening and Faceting of Coherent Precipitates | <i>P. Bellon</i> | 397 |
| Electron-Irradiation-Induced Structural Change of Graphite | <i>S. Muto and T. Tanabe</i> | 401 |
| Disordering Kinetics in Ni ₄ Mo under Irradiation with Electrons and Mo Ions | <i>K. Yasuda, T. Watanabe, S. Matsumura and C. Kinoshita</i> | 405 |
| Modeling of the Heterogeneous Long Range Ordering Induced by Cascade Irradiation in L1 ₂ Ordered Alloys. | <i>C. Abromeit and S. Matsumura</i> | 409 |
| Disordering Kinetics of Ni ₃ Al Precipitates under Ion Irradiation | <i>G. Schmitz, J. C. Ewert, F. Haider, F. Harbsmeier and M. Uhrmacher</i> | 413 |
| Dissolution of Ordered Precipitates due to Heterogeneous Disordering under Irradiation with Energetic Particles. | <i>S. Matsumura, M. Okudaira and C. Kinoshita</i> | 417 |
| Amorphization and Order-Disorder in Ni-Al System under High Energy Ion-Irradiation: A Computer Simulation Study. | <i>A. Almazouzi, M. Spaczér, M. Alurralde and M. Victoria</i> | 421 |
| Ion-Implantation-Induced Phase Transformation in III-V Compound Semiconductors. | <i>M. Taniwaki, Y. Hayashi and T. Yoshiie</i> | 425 |
| Formation of Copper Precipitate in FeCu and FeCuC Alloys with Irradiation | <i>F. Hori, A. Morita, H. Nishizawa and R. Oshima</i> | 429 |

2.7. Diffusion

| | | |
|--|--|-----|
| *Solid State Diffusion and Configurational Kinetics | <i>M. Athènes, F. Soisson, P. Bellon and G. Martin</i> | 433 |
| *Diffusion of Nickel in Pd ₄₀ Cu ₃₀ Ni ₁₀ P ₂₀ Metallic Glass | <i>H. Nakajima, T. Kojima, T. Zunkley, N. Nishiyama and A. Znoue</i> | 441 |
| Retarded Diffusion and Decomposition of Zr ₄₁ Ti ₁₄ Cu _{12.5} Ni ₁₀ Be _{22.5} Bulk Glass. | <i>M.-P. Macht, V. Naundorf, P. Fielitz, J. Rüsing, E. Budke and G. Fronhberg</i> | 445 |
| Enhancement of Diffusion by Martensitic Transformations | <i>A. Seeger, O. Wieland, H. D. Carstanjen, W. Frank and M. Neumann</i> | 449 |
| The Mathematical Model and Computer Simulation of Interdiffusion Driven by the Reactions at Interfaces. | <i>M. Danielewski, R. Filipek, K. Holly, M. Hetmańczyk and J. Łaskawiec</i> | 453 |
| *Access to Atomic Jump Processes in Ordered Alloys | <i>W. Pfeiler, H. Lang, W. Püschl and R. Kozubski</i> | 457 |
| *Point Defects and Diffusion in Ni ₃ Al. | <i>H. Numakura, N. Kurita and M. Koiwa</i> | 465 |
| “Order-Order” Kinetics in Intermetallics: Experimental and Computer-Simulation Study. | <i>R. Kozubski, P. Oramus, W. Pfeiler, V. Pierron-Bohnes and M. C. Cadeville</i> | 473 |
| Long-Range Order and Diffusion in Iron-Aluminides | <i>H. Mehrer, M. Eggersmann, M. Salamon, C. Khoukaz, R. Galler, S. Dorfman and D. Fuks</i> | 477 |

*invited paper

| | | |
|--|---|-----|
| Measurements of Intrinsic Diffusion Coefficients in Ni ₃ Al | <i>K. Fujiwara, M. Watanabe, Z. Horita, M. Nemoto, K. Noumi and T. Simozaki</i> | 481 |
| Reaction Diffusion between Commercial Al Alloys and Stainless Steel during Friction Welding. | <i>S. Fukumoto, H. Tsubakino, K. Okita, M. Aritoshi and T. Tomita</i> | 485 |
| Local Characterization of the Diffusion Process during Discontinuous Phase Transformations. | <i>P. Zięba and W. Gust</i> | 489 |
| Deviation from Darken's Relation in Au/Fe Diffusion Couples. | <i>Y. Yamazaki and Y. Zijima</i> | 493 |
| Prediction of Interfacial Reactions Using Diffusion Simulation. | <i>B.-J. Lee</i> | 497 |
| Nitriding of Experimental High Vanadium Alloys | <i>H. Larsson, H. Wisell and J. Ågren</i> | 501 |
| Interfacial Reaction and Diffusion Path in AlN/Metal Systems. | <i>M. Naka and M. H. El-Sayed</i> | 505 |
| Interfacial Structure and Diffusion Path of SiC/Metal Systems. | <i>T. Fukai, M. Naka, J. C. Schuster and T. Shibayanagi</i> | 509 |
| Interdiffusion in Au/Ni Diffusion Couple | <i>T. Sugiyama, Y. Yamazaki and Y. Zijima</i> | 513 |
| Reaction Diffusion in Co-Ti System. | <i>O. Taguchi and Y. Zijima</i> | 517 |
| Point Defects in B2-type Ordered FeAl Alloys. | <i>T. Haraguchi and M. Kogachi</i> | 521 |

2.8. Effect of Elastic Strain Energy

| | | |
|---|---|-----|
| *On the Splitting of Coherent Precipitates. | <i>J. K. Lee</i> | 525 |
| *Elastic Misfit Effects in Solid Phase Transitions. | <i>A. Onuki</i> | 533 |
| Equilibrium Shapes of Coherent, Misfitting Precipitates | <i>T. A. Abinandanan, R. Sankarasubramanian and C. S. Jog</i> | 541 |
| *Morphological Evolution of γ' -type Particles in Ni-Base Alloys: Shape Characterization. | <i>F. Li, S. V. Prikhodko, A. J. Ardell and D. Kim</i> | 545 |
| Development of Spatial Correlations during Coarsening in Elastically Stressed Solids. | <i>N. Akaiwa, K. Thornton and P. W. Voorhees</i> | 553 |
| 3-Dimensional Monte Carlo Simulations of Directional Precipitate Coarsening in Alloys under External Load | <i>H. Gupta, R. Weinkamer, P. Fratzl and J. L. Lebowitz</i> | 557 |
| Effects of Elastic Anisotropy on Growth of Metastable Precipitates in a Cu-Be Alloy | <i>A. Yamamoto and H. Tsubakino</i> | 561 |

2.9. Grain Boundary and Interface

| | | |
|--|---|-----|
| *Surface Roughening Transition and Coarsening of Grains in Liquid Matrix | <i>D. Y. Yoon and C. W. Park</i> | 565 |
| Interphase Boundary Structure of Grain Boundary Precipitate in a Ni-Cr Alloy | <i>K. Oishi, T. Furuhashi and T. Maki</i> | 573 |

*invited paper

| | | |
|---|---|-----|
| Morphological Stability of γ'/β Interface Formed in Ni-Al-X Ternary Diffusion Couples. | R. Kainuma, M. Ichinose, I. Ohnuma and K. Zshida | 577 |
| Use of D-Lattice for Study of Crystallography of Phase Transformations | W.-Z. Zhang | 581 |
| Effects of Grain Boundary Allotriomorphs on Growth of Discontinuous Coarsening in TiAl(γ)-Ti ₃ Al(α_2)Lamellar Alloys. | S. Mitao and L. A. Bendersky | 585 |
| Prediction and Observation of Interface Boundary Structure in BCC/HCP Alloy System. | N. Miyano, K. Ameyama and G. C. Weatherly | 589 |
| *Composition Dependence of Kinetics of Diffusion Induced Recrystallization in Polycrystalline Cu/Ni Diffusion Couples. | Y. Yamamoto, S. Uemura and M. Kajihara | 593 |
| Temperature and Orientation Dependence of Austenite/B1 Type Compound Interfacial Energy. | Z.-G. Yang and M. Enomoto | 599 |
| Diffusion in Multilayered Nb/Ti Materials. | R. Taillard and A. Belhadj | 603 |
| *Effect of Misfit Strain on the Growth of Intermediate Phases | W. C. Johnson and B. R. Hinderliter | 607 |

III. Computational Approach to Phase Transformations

3. I. Atomistic Approach to Phase Equilibria

| | | |
|---|---|-----|
| *The Status of First Principles Phase Diagram Calculations. | D. de Fontaine | 617 |
| *Integrated Quantum-Mechanical Approach to Stability, Chemical Order and Phase Evolution in Complex Alloys. | P. E. A. Turchi, D. Mayou and J. P. Julien | 625 |
| Impurity-Impurity Interaction Energies in Metals and Phase Diagrams of Binary Alloys. | T. Hoshino and M. Asato | 629 |
| Solid Solubility Limit of Impurities in Metals by KKR-Green's ρ -Function Method and Cluster Variation Method. | M. Asato, T. Hoshino and K. Masuda-Jindo | 633 |
| Theoretical Studies of Substoichiometric MoC _{1-x} | H. W. Hugosson, O. Eriksson and B. Johansson | 637 |
| Adiabatic Potential Surface for bcc-hcp Transformation in Titanium | M. Aoki, H. Kawabe and S. R. Nishitani | 641 |
| Modification of Electronic Structure due to Phase Transition in Perovskite-Type Oxide, SrZrO ₃ | M. Yoshino, H. Yukawa and M. Morinaga | 645 |
| Simulations of Dilute Tungsten-Boron Solid Solutions | S. Dorfman, V. Liubich, D. Fuks and K. C. Mundim | 649 |
| Concentration Dependence of Interaction Parameters in Fe-Al Alloy from Non-Empirical Study. | S. Dorfman, D. Fuks and V. Liubich | 653 |
| Role of Chemical Bonding State on the Stability of Cubic Zirconia | A. Kuwabara, J. Katamura, Y. Ikuhara and T. Sakuma | 657 |
| Numerical Calculation with Empirical Interatomic Potential for Ordering Mechanism of InGaAs/(InO)InP. | Y. Kangawa, M. Suenaga, N. Kuwano and K. Oki | 661 |
| Continuous Displacement CVM of Elastic Constants of BCC Alloys | R. Kikuchi and K. Masuda-Jindo | 665 |

*invited paper

| | | |
|--|---|-----|
| Configurational Thermodynamics and Kinetics Studied by Cluster Variation and Path Probability Methods. | <i>T. Mohri</i> | 669 |
| Brittle Fracture: A Non Equilibrium Dynamic Instability Leading to a Coherent Acoustic Emission. | <i>G. Benedek, G. Caglioti and T. Mohri</i> | 673 |
| Theory of Instability Phenomena and its Application to Amorphous Structure. | <i>Y. Aikawa and K. Fujii</i> | 677 |
| Metal-Hydrogen Interaction in Hydrogen Storage Compounds | <i>K. Nakatsuka, M. Takagi, M. Nakai, H. Yukawa and M. Morinaga</i> | 681 |
| A Direct Observation of Electron Density Level Structural Change Through Phase Transition. | <i>M. Takata, T. Zkeda, E. Nishibori, K. Kato and M. Sakata</i> | 685 |

3.2. Phenomenological Study of Phase Equilibria

| | | |
|--|---|-----|
| Progress in the Thermodynamic Modelling of Order/Disorder Transformations with the Compound Energy Formalism | <i>B. Sundman, S. G. Fries, A. Kusofsky and W. A. Oates</i> | 689 |
| The Molar Gibbs Energy and Phase Equilibria Computations. | <i>J. Tomiska</i> | 693 |
| Applications of Multicomponent Phase Diagrams to Aluminum Alloys | <i>C. Sigli and R. Shahani</i> | 697 |
| Phase Equilibria Exhibiting Anomalies due to Order-Disorder Transition | <i>H. Ohtani</i> | 701 |
| Phase Equilibrium in the Fe-Co Side of Fe-Ge-Co Ternary Ordering System | <i>T. Kozakai and T. Miyazaki</i> | 705 |
| Symmetry-Breaking Transitions in Equilibrium Shapes of Isolated, Coherent Particles in Cubic Crystals. | <i>R. Sankarasubramanian, C. S. Jog and T. A. Abinandanan</i> | 709 |

3.3. Computer Simulation of Phase Transformations

| | | |
|---|---|-----|
| Time Dependent Ginzburg-Landau Approach to Pattern Formations in Cubic-Tetragonal Structural Transformations. | <i>Y. Yamazaki</i> | 713 |
| Coupling of Multicomponent Thermodynamic Databases to a Phase Field Model: Application to γ' Growth in a Ternary Ni-Al-Cr Model Superalloy | <i>U. Grafe, B. Böttger, J. Tiaden and S. G. Fries</i> | 717 |
| Real-Time Scaled Simulations of GP-Zone Formation in AlCu | <i>L. Löchte, C. Feig and G. Gottstein</i> | 721 |
| *Phase-Field Simulation of Hexagonal→Orthorhombic Transformations | <i>Y. H. Wen, Y. Z. Wang, L. Bendersky and L. Q. Chen</i> | 725 |
| Computer Simulation of the Phase Decomposition in Real Alloy Systems Based on the Phase Field Method. | <i>T. Koyama, T. Kozakai and T. Miyazaki</i> | 733 |
| A Phase-Field Model for Diffusion and Curvature Controlled Phase Transformations in Steels. | <i>J. Tiaden and U. Grafe</i> | 737 |
| Using Neural Networks to Describe Complex Phase Transformation Behavior | <i>J. M. Vitek and S. A. David</i> | 741 |

*invited paper

| | | |
|---|---|-----|
| *Computer Simulation of Atomic Lattice Models for Phase Separation in Alloys with Coherent Lattice Misfit. | <i>P. Fratzl, O. Penrose and J. L. Lebowitz</i> | 745 |
| Monte Carlo Study of Precipitation of Two Phases in a Ternary Alloy | <i>T. A. Abinandanan, A. P. Raju and M. Rajesh</i> | 753 |
| Kinetics of Decomposition of Metastable Solid Solutions: Comparison between Monte Carlo Simulations and Classical Theories. | <i>F. Soisson and G. Martin</i> | 757 |
| Modelling of Microstructural Evolutions in Ni-Base Superalloys under Stress | <i>Y. Saito, S. Tanabe, E. Onuma, H. Murakami and H. Harada</i> | 761 |
| *Heterophase Omega Phase Formation and Elastic Energy. | <i>H. Kubo</i> | 765 |
| Elementary Events of Nucleation of Phase Transformation in a Computer-Modeled Metal. | <i>T. Makino, K. Okouchi, K. Itoigawa and S. Matsuda</i> | 773 |
| Graphical Molecular Dynamics Simulator for Materials Simulations | <i>D. K. Choi and J.-H. Kim</i> | 777 |
| MD-Calculations of the Spinel Formation at the Alumina/Magnesia Interface: Building and Confirming the Model. | <i>W. Wunderlich and H. Awaji</i> | 781 |
| Classical Molecular Dynamics Method as a Tool for Studying Phase Transformations. | <i>M. Takeuchi, Y. Masuda and S. Muto</i> | 785 |
| Kinetics of Consecutive, Coupled Phase Transformations | <i>A. T. W. Kempen, F. Sommer and E. J. Mittemeijer</i> | 789 |
| The Role of Dislocation as a Nucleation Site of Phase Transformation in a Computer-Modeled Metal. | <i>Y. Sato, T. Makino and S. Matsuda</i> | 793 |

Pt. II

IV. Displacive Transformations

4.1. Premartensitic Phenomena

| | | |
|--|---|-----|
| *Neutron Scattering Studies of Pre-transitional Effects in Solid-Solid Phase Transformations. | <i>S. M. Shapiro</i> | 799 |
| *Electronic Origin of the Martensitic Transitions in Fe-Based Systems and Hume-Rothery Systems: A Comparison | <i>E. F. Wassermann, J. Kästner, M. Acet and P. Entel</i> | 807 |
| *Transitional Structure of Martensitic Transformation in AuCd Alloys. | <i>T. Ohba</i> | 815 |
| Vibrational Anharmonicity and Martensitic Transition in Cu-Based Alloys, | <i>L. Manósa, A. González-Comas and A. Planes</i> | 823 |
| Elastic Softening of $Ti_{49.2}Ni_{50.8}$ Single Crystal Prior to B2-B19' Martensitic Transformation. | <i>N. Miura, J. Zhang, X. Ren, K. Otsuka, T. Suzuki, K. Tanaka, Yu. I. Chumlyakov and M. Asai</i> | 827 |

4.2. Phase Stability and Role of Lattice Defects

| | | |
|---|------------------|-----|
| *On the Stability of Martensitic and Equilibrium Phases in the Noble Metal Alloys | <i>M. Ahlers</i> | 831 |
|---|------------------|-----|

*invited paper

| | | |
|--|---|-----|
| *Mechanism of Martensite Aging Effect and Rubber-Like Behavior | <i>X. Ren and K. Otsuka</i> | 839 |
| Role of Lattice Defects in Martensitic Transformation | <i>T. Suzuki and M. Shimono</i> | 847 |
| Atomistic Simulation of the Martensitic Transformation with a Periodic Boundary Condition. | <i>M. Shimono, H. Onodera and T. Suzuki</i> | 851 |
| Ab Initio Study of Displacive Phase Transformations in Iron | <i>M. Šob, M. Friák, L. G. Wang and V. Vitek</i> | 855 |
| Elastic Compatibility, Martensitic Textures and Weak Plasticity | <i>A. Saxena, T. Lookman, S. R. Shenoy and A. R. Bishop</i> | 859 |
| The Influence of Plastic Distortion on the Evolution of a Phase Transformation Front. | <i>I. Dobovšek</i> | 863 |
| Dynamic Effects in Cu-Zn-Al Shape Memory Alloys. | <i>V. Torra and A. Zalgue</i> | 867 |
| Charge Density Distribution of the Parent Phase of a Cu-Al-Ni Alloy by the Maximum Entropy Method. | <i>Y. Kubota, T. Kagotani, K. Kifune, T. Tadaki, E. Nishibori, M. Takata, M. Sakata and Y. Nakata</i> | 871 |
| B2 \rightarrow γ_2' + ζ_2' Martensitic Transformation in Au-48.5at%Cd Alloy | <i>T. Zshii, X. Ren, K. Otsuka and A. Nukui</i> | 875 |
| Influence of Vacancies on Ageing Effect in AuCd Shape Memory Alloys | <i>T. Zto, T. Haraguchi, M. Kogachi, T. Ohba, X. Ren and K. Otsuka</i> | 879 |
| Empirical Examination of the Validity for Martensitic Stainless Steels of the Model for Predicting M_s Temperature. | <i>H. Nakagawa and T. Miyazaki</i> | 883 |
| Decomposition Phenomena in Ni-Mn-Ti Austenite | <i>D. Schryvers, J.-W. Seo, R. Oliver, W. Vermeulen and P. Potapov</i> | 887 |
| Martensitic Transformation of Yttria-Stabilized Tetragonal Zirconia Polycrystals during Superplastic Deformation. | <i>H.-G. Jeong, K. Higashi and K. Hiraga</i> | 891 |
| Transmission Electron Microscopy of Metal-Insulator Phase Transition of Spinel Type CuIr ₂ S ₄ Compound. | <i>R. Oshima, H. Zhibashi, K. Tanioka and K. Nakahigashi</i> | 895 |
| Structural and Magnetic Phase Transitions in MnCo _{0.97} Ge | <i>T. Kanomata, H. Zshigaki, T. Suzuki and T. Kaneko</i> | 899 |
| Coherency Constrains and Martensite Transformation of Iron Particles Embedded in Cu-Fe Matrix. | <i>A. M. Wusatowska-Sarnek, H. Miura and T. Sakai</i> | 903 |

4.3. Kinetics of Martensitic Transformations

| | | |
|--|--|-----|
| *Kinetics and Origin of Martensitic Transformations in Some Ferrous and Non-Ferrous Alloys. | <i>T. Kakeshita and T. Saburi</i> | 907 |
| AFM Study of Martensite Formed Isothermally in Zirconia-Yttria System | <i>H. Tsubakino, Y. Kuroda and M. Niibe</i> | 915 |
| Acoustic Emission Behavior during Martensitic Transformation of Cu-Al-Ni Shape Memory Alloy Single Crystal | <i>K. Yoshida, S. Kihara and K. Sakamaki</i> | 919 |

*invited paper

| | | |
|---|---|-----|
| <i>In-Situ</i> Mossbauer Study on the Nucleation Process of Martensitic Transformation in Fe _{68.3} Ni _{31.7} Alloy. | <i>Y. Yoshida, N. Murase, T. Kakeshita and T. Saburi</i> | 923 |
| Evaluation of Nonchemical Energies due to Specimen Size Effect Based on New Thermodynamic Scheme for Thermoelastic Martensitic Transformations. | <i>H. Sakamoto</i> | 927 |
| The Effect of Specimen Size on Martensitic Transformation in Ti-50 at%Ni Alloy under Quasi-Static Condition. | <i>H. Sakamoto, H. Sakamoto and S. Onai</i> | 931 |
| A New Treatment for the Nucleation of Martensite by Thermal Activation | <i>A. Borgenstam and M. Hillert</i> | 935 |
| Kinetics of the Martensitic Transformations in Au-Cd Alloys | <i>H. Saitoh, M. Fujimoto, H. Abe, R. Matsuo, M. Takimoto, Y. Matsuo and K. Ohshima</i> | 939 |
| Martensitic Nucleation by Thermal and Mechanical Activation in Iron Based Alloys. | <i>X. Q. Zhao</i> | 943 |

4.4. New Experimental Techniques for Studying Displacive Transformations

| | | |
|---|--|-----|
| *Advanced TEM Studies of Martensite and Related Phase Transformations | <i>D. Schryvers</i> | 947 |
| Electron Energy-Loss Spectroscopy on Phase Transformation of Alloys. | <i>D. Shindo, Y. Murakami and Y. Zkematsu</i> | 955 |
| *Use of AFM and TEM to Study the Intrinsic Strain Associated with Martensitic and Bainitic Transformations. | <i>K. Marukawa, I. Kumagai and M. Tabuchi</i> | 959 |
| Structural Transformation in Bi _{1-x} Ca _x MnO ₃ (0.75 ≤ x ≤ 0.95) Studied by Electron Energy-Loss Spectroscopy. | <i>Y. Murakami, K. Ando and D. Shindo</i> | 965 |
| High-Resolution Electron Microscopy Studies of the Austenite-Martensite and the Austenite-Bainite Interfaces in Fe-Based Alloys. | <i>S. Kajiwara, K. Ogawa, T. Kikuchi, H. Okamoto and M. Oka</i> | 969 |
| Studies of Displacive Phase Transformations in Crystalline Solids Using Grazing-Incidence X-ray Techniques. | <i>G. Landmesser, U. Klemradt, T. R. Finlayson, R. L. Johnson and J. Peisl</i> | 973 |
| Field Induced Martensitic Transformation in Co and Co Alloys | <i>T. Tanaka, M. Takahashi and S. Kadowaki</i> | 977 |
| Phase Transformation of Fe-Rh Alloys Induced by High Speed Deformation | <i>R. Oshima, M. Fukuzumi, F. Hori, M. Komatsu and M. Kiritani</i> | 981 |
| <i>In-Situ</i> Observation of Stress-Induced Martensite Transformation in SUS304 Stainless Steel by Mossbauer Spectroscopy. | <i>Y. Yoshida and N. Murase</i> | 985 |
| Positron Annihilation Study of Phase Transition for fcc FeNi Alloys | <i>K. Ohmori, T. Shimizu, T. Hamajima, Y. Muneyoshi and M. Matsui</i> | 989 |

4.5. Ferrous Shape Memory Alloys

| | | |
|---|---|-----|
| High Speed Deformation and Structural Change in Ferrous Shape Memory Alloys | <i>N. Yoneyama, T. Masuya, S. Kumai and A. Sato</i> | 993 |
|---|---|-----|

*invited paper

| | | |
|---|--|------|
| Influence of Carbon on the Shape Memory Effect in Fe-Mn-Si Alloys. | <i>D. P. Dunne and H. Liu</i> | 997 |
| AFM Observation on Surface Relief Produced by Stress-Induced Martensitic Transformation in Fe-Mn-Si-Cr Shape Memory Alloy | <i>D. Liu, T. Kikuchi, S. Kajiwara and N. Shinya</i> | 1004 |
| Transformation Conditions in an Fe-Based Shape Memory Alloy under Multiaxial Stresses. | <i>K. Tanaka, T. Watanabe and F. Nishimura</i> | 1008 |
| Martensitic Transformation FCC→HCP. | <i>T. Y. Hsu (Xu Zuyao)</i> | 1012 |
| Coherency Strain Energies of Transformation Dislocations in CoFe Alloys | <i>T. Waitz, H. P. Karnthaler and C. Rentenberger</i> | 1016 |
| Observation on Reversion of Stress-Induced Martensite in Fe-Mn-Si-Cr Shape Memory Alloy Using Atomic Force Microscopy | <i>D. Liu, T. Kikuchi, S. Kajiwara and N. Shinya</i> | 1020 |
| The Effect of Stacking Fault Configuration on the Martensitic Transformation in Fe-Mn-Si Alloys. | <i>Y. H. Rong, Z. H. Guo, S. P. Chen, T. Y. Hsu (Xu Zuyao) and Y. X. Guo</i> | 1024 |
| Internal Friction Versus Time in a CuZnAl Poly-Crystal | <i>M. P. Baron and M. Morin</i> | 1028 |
| Study of Stress Induced Martensitic Transformation in Fe-Ni-C Alloys | <i>M.-X. Zhang, P. M. Kelly and J. D. Gates</i> | 1032 |

4.6. Ti-Ni-based Shape Memory Alloys

| | | |
|---|---|------|
| Effect of Thermal Cycling on Martensitic Transformations in Ti-Pd-Ni Alloys | <i>W. Cai and K. Otsuka</i> | 1036 |
| Twin Boundary Motions and Associated Elastic and Anelastic Features in H-doped NiTi Alloys. | <i>A. Biscarini, R. Campanella, B. Coluzzi, L. Di Masso, G. Mazzolai and F. M. Mazzolai</i> | 1040 |
| Thermomechanical Behavior of TiPd-Based SMA Reinforced Ti Matrix Smart Composites. | <i>K. Mizuuchi, K. Znoue, K. Hamada, K. Yamauchi, K. Enami, M. Ztami and Y. Okanda</i> | 1044 |
| HREM Studies on the Deformed Martensite in Cold Rolled TiNi Alloys | <i>Y. F. Zheng, L. C. Zhao and H. Q. Ye</i> | 1048 |
| Mechanical Fatigue Crack Growth Characteristics of a Ti-Ni-Cu Shape Memory Alloy. | <i>Y. Kishi, Z. Yajima, K. Shimizu and M. Asai</i> | 1052 |
| Cyclic Deformation Properties of TiNi Shape Memory Alloy | <i>H. Tobushi, Y. Shimeno, K. Takata and T. Hashimoto</i> | 1056 |
| Boundary Structure of (121) Type II Twin in B19 Martensite in Ti-Pd Shape Memory Alloy. | <i>S. Zi, M. Nishida and K. Hiraga</i> | 1060 |

4.7. Thin Film Shape Memory Materials

| | | |
|--|---|------|
| Martensitic Phase Transformation in NiTi Thin Films Studied by NMR | <i>S. Crevoiserat, P. Scherrer, T. Lehnert, C. Dimitropoulos and R. Gotthardt</i> | 1064 |
|--|---|------|

*invited paper

| | | |
|---|--|------|
| Lattice Softening and its Relation to the Martensitic Transformation in Nanometer-Sized Particles of Fe-Ni Alloys. | <i>K. Asaka, Y. Hirotsu and T. Tadaki</i> | 1068 |
| Characterization of Cu-Al-Ni Based Melt Spun Shape Memory Ribbons. | <i>C. Seguí, T. Goryczka, J. Pons, E. Cesari and H. Morawiec</i> | 1072 |
| Ageing Evolution of the Transformation Behaviour in Some NiTi-Based Melt-Spun Ribbons. | <i>R. Santamarta, E. Cesari, J. Pons, C. Seguí, P. Ochin and R. Portier</i> | 1076 |
| Shape Fixity and Shape Recovery in a Film of Shape Memory Polymer of Polyurethane Series. | <i>H. Tobushi, N. Zto, K. Takata and S. Hayashi,</i> | 1080 |
| Stress Induced Martensite in NiTi Corrugated Films | <i>M. Wuttig, Y. Zheng, J. S. Slutsker, K. Mori and J. Li</i> | 1084 |
| High Resolution Observation of Guinier-Preston Zones in Sputter-Deposited Ti-Rich Ti-Ni Thin Films. | <i>Y. Nakata, T. Tadaki, Y. Hirotsu, H. Sakamoto, A. Tanaka and K. Shimizu</i> | 1088 |
| Further Studies on Non-Equilibrium Phase and Nanocrystals Formed during Crystallization of Amorphous Ti-Rich Ti-Ni Thin Films | <i>T. Kikuchi, K. Ogawa, S. Kajiwara, T. Matsunaga and S. Miyazaki</i> | 1092 |
| The Effect of Texture on Shape Memory in Cu-Al-Ni Melt-Spun Ribbons | <i>H. Morawiec, J. Lelqtko and E. Cesari</i> | 1096 |

4.8. New Shape Memory Materials

| | | |
|---|---|------|
| *Structural Phase Transformations in Ni-Mn-Ga Alloys. | <i>V. V. Kokorin</i> | 1100 |
| Martensitic Transformation and Magnetic Properties of Ni-base Heusler Alloys | <i>K. Tsuchiya, A. Ohashi and M. Umemoto</i> | 1108 |
| Phase Transformations in Melt-Spun Ni-Mn-Ga Alloys | <i>V. Chernenko, C. Seguí, J. Pons, E. Cesari, P. Ochin and R. Portier</i> | 1112 |
| Ordering and Quasi-Martensitic Transformations in Au-Cu-Al Alloys. | <i>F. C. Levey and M. B. Cortie</i> | 1116 |
| Martensitic and Magnetic Transformations in Ni ₂ MnGa-Based Alloys | <i>K. Znoue, K. Enami, M. Zgawa, K. Znoue, Y. Yamaguchi and K. Ohoyama</i> | 1120 |
| Phase Transformation of Ni _{2+x} Mn _{1-x} Ga(x=0~0.19) | <i>M. Matsumoto, T. Kanomata, M. Ebisuya, T. Kaneko, T. Takagi, J. Tani and T. Fujino</i> | 1124 |

4.9. Diffusional-Displacive Phase Transformations

| | | |
|---|---|------|
| *Characteristics of Diffusional-Displacive Transformation Products | <i>B. C. Muddle and J. F. Nie</i> | 1128 |
| * <i>In Situ</i> High-Resolution and Energy-Filtering Transmission Electron Microscope Observations of Interphase Boundary Dynamics in Diffusional and Diffusionless FCC-HCP Phase Transformations. | <i>J. M. Howe, M. M. Tsai and A. A. Csontos</i> | 1136 |
| Defect Mechanism of Phase Transformations. | <i>R. C. Pond, T. Nixon and J. Hirth</i> | 1144 |
| *Study on the Formation Mechanism of Bainite | <i>H.-S. Fang, C. Zhang and Y.-K. Zheng</i> | 1148 |

*invited paper

| | | |
|--|--|------|
| Homogeneous Precipitation of L1 ₀ Type Ordered FePd in Advanced Heat-Resistant Martensitic Steels. | <i>M. Zgarashi and S. Muneki</i> | 1156 |
| Interaction of Phase Transformation and Heat Production | <i>F. D. Fischer, E. R. Oberaigner, G. Wagendorfer and K. Tanaka</i> | 1160 |
| Bainitic Transformation in High Mn Austempered Ductile Iron | <i>M. N. Ahmadabadi</i> | 1164 |
| HCP Phase Produced in the Temperature Range of Lower Bainite Formation in an Fe-2Si-1.4C Alloy. | <i>K. Ogawa, S. Kajiwara, H. Okamoto and M. Oka</i> | 1168 |
| Formation Process of Columnar and Nodular Bainites in Hypereutectoid Plain Carbon Steels. | <i>H. Okamoto and M. Oka</i> | 1172 |
| Bainitic Microstructure and its Transformation Kinetics in Low Carbon Steels | <i>M. Takahashi, Y. Watanabe and H. Tamemhiro,</i> | 1176 |
| Surface Reliefs of Black Plates in a Ti-Mo Alloy | <i>H. Guo, M. Enomoto and J. Wang</i> | 1180 |
| Investigation of ω -Phase Transformation in β -Ti Alloys due to Quenching, Stressing and Cooling Using Electron Microscopy. | <i>E. Sukedai, H. Matsumoto and H. Hashimoto</i> | 1184 |
| ω Phases in β -Ti Alloys, an Example of Diffusionless and Diffusional Phase Transformation. | <i>S. Komatsu, M. Zkeda and T. Sugimoto</i> | 1188 |
| TEM and HRTEM Study of 4H Precipitates Produced during the Dezincification of β Cu-Zn. | <i>H. E. Troiani, A. Tolley and M. Ahlers</i> | 1192 |

V. Phase Transformations in New Materials

5.1. Nano-Crystallization

| | | |
|--|--|------|
| *Production and Application of Zr-Based Bulk Amorphous Alloys Containing Nanocrystalline Particles. | <i>A. Znoue, C. Fan and T. Zhang</i> | 1199 |
| Atom Probe Studies of Nanocrystallization of Amorphous Alloys | <i>K. Hono and D. H. Ping</i> | 1207 |
| Structural Evolution of Zr ₆₀ Al ₁₅ Ni ₂₅ Bulk Metallic Glass in Supercooled Liquid Region. | <i>S. Sato, E. Matsubara, S. Tanaka, M. Zmafuku, Y. Waseda, T. Zhang and A. Znoue</i> | 1211 |
| Bulk Nanocrystalline Amorphous Alloys. | <i>C. Fan and A. Znoue</i> | 1215 |
| Control of Nanocrystalline Structure for Bulk Glassy Metal | <i>Y. Yokoyama, K. Yamano, K. Fukaura, H. Sunada and A. Znoue</i> | 1219 |
| Nanostructure Analysis of Amorphous Fe-Zr-B(-Cu) Alloys in the Early Stage of Crystallization. | <i>H. Kai, T. Ohkubo, Y. Nakata, Y. Hirotsu and A. Makino</i> | 1223 |
| TEM Observation of Recrystallization of Amorphous Silicon Formed by Gold Implantation. | <i>K. Matsuoka, H. Kohno and S. Takeda</i> | 1227 |
| Structural Modification of Amorphous Silicon by Intense X-ray Irradiation | <i>S. Muto, Y. Kobayashi, K. M. Yu, W. Walukiewicz, C. J. Echer, H. C. Jin and J. R. Abelson</i> | 1231 |

*invited paper

| | | |
|---|--|------|
| Effects of Electropulsing on the Crystallization Process in Amorphous Pd ₈₀ Si ₂₀ . . . | <i>H. Mizubayashi and N. Kameyama</i> | 1235 |
| Activation Energy in Crystallization Process of Tb-Fe and Tb-Fe-Si Amorphous Alloys. | <i>K. Yamada, Y. Iijima, K. Fukamichi and M. Dezuka</i> | 1239 |
| Microstructure of C60/Nanotube Composites Produced under High Pressure . . . | <i>H. Satsuki, T. Kuzumaki, T. Hayashi, M. Akaishi,</i> | |
| . . . I | <i>K. Miyazawa, H. Zchinose and K. Zto</i> | 1243 |
| Formation of Ductile Amorphous Ni-W and Fe-W Electrodeposits and Their Nanocrystallization. | <i>T. Yamasaki, R. Tomohira and Y. Ogino</i> | 1247 |
| Crystallization Processes of Nd-Fe-Cr-B Amorphous Ribbons | <i>Y. Ohmori, Y. Kadoya, K. Nakai, S. Hirose and H. Kanekiyo</i> | 1251 |

5.2. Thin Film, Interfaces and Nano-Structure

| | | |
|--|--|------|
| Atomic and Magnetic Structures of Fe-Cu Alloys Prepared by Mechanical Alloying Technique. | <i>H. Zno and K. Tokumitsu</i> | 1255 |
| Phase Transformations Induced in Nanocrystalline Materials during Mechanical Alloying. | <i>B. S. Murty, J. Joardar, M. K. Datta and S. K. Pabi</i> | 1259 |
| Transformations in Mechanically Alloyed Co-Fe-Ti Powders. | <i>H. A. Calderdn, J. G. Cabanas-Moreno, R. Martinez-Sanchez,</i> | |
| | <i>L. Rendón, M. Umemoto and E. Van Cappellen</i> | 1263 |
| Mechanical Milling of Intermetallic Compounds R ₂ TM ₁₇ (R=Y, Gd and TM=Fe, Ni) | <i>H. Takano, K. Honda, Y. Mitsuboshi, S. Murayama,</i> | |
| | <i>K. Hoshi, K. H. J. Buschow and H. Bakker</i> | 1267 |
| Solid State Amorphization of Structural Ceramics by Mechanical Alloying | <i>H. Kimura and K. Hongo</i> | 1271 |
| *Phase Transformations in Constrained Films. | <i>A. L. Roytburd</i> | 1275 |
| Interreaction of Al/Ag Thin Layers. | <i>G. Schmitz, O. Svenson, P. Troche and F. Harbsmeier</i> | 1283 |
| Magnetic Transformation of Low Dimensional Magnetic Materials | <i>B. Sadeh, Y. Yamada, Y. Kondo and M. Matsui</i> | 1287 |
| *Phase Equilibrium in Nanometer-Sized Particles. | <i>H. Mori and H. Yasuda</i> | 1291 |
| Segregation Induced Phase Transformations in Nanostructures. | <i>D. L. Beke, Z. Erdélyi, P. Bakos, C. Cserhádi and I. A. Szabó</i> | 1297 |
| New Fullerenes in the C-B-N System Formed through Electron Irradiation Induced Solid State Phase Transformation. | <i>D. Golberg, Y. Bando,</i> | |
| | <i>O. Stéphan, K. Kurashima, T. Sasaki, T. Sato and C. Goringe</i> | 1301 |
| Synthesis of Lithium Storage Intermetallic Compounds and Their Anode Behaviors in Secondary Batteries. | <i>H. Sakaguchi, H. Honda, H. Maeta and T. Esaka</i> | 1305 |
| Common Features of Phase Changes in Metastable Transition Metal Carbides Such as Fe-C, Ni-C and Co-C Prepared by Reactive Sputtering | <i>O. Nittono, M. Azumi, Y. Hashiba and M. Wakamori</i> | 1309 |
| Relation Between Phase Separation and Properties of Al-N-Co and Al-N-Co/Al-Co Films. | <i>A. G. Roy and O. Nittono</i> | 1313 |

*invited paper

| | | |
|--|---|------|
| Phase Changes in Compound Films Prepared by Alternate Stacking of In and Sb Layers. | <i>M. A. Taher, D. Fukushima and O. Nittono</i> | 1317 |
| The Phase Transformation of CVD κ -Al ₂ O ₃ Multilayers Separated by Thin Intermediate TiN or TiC Layers. | <i>C. Berne, M. Halvarsson, A. Larsson and S. Ruppi</i> | 1321 |
| Transmission Electron Microscopy and Electron Diffraction Study of the Alloying Process of Gold-Indium Films | <i>K. Kifune, Y. Kubota, K. Yamamoto and T. Tadaki</i> | 1325 |
| Microstructure Changes during Annealing of Ag/Amorphous-Si and Al/Amorphous-Si Bilayer Films Deposited on SiO ₂ Substrate. | <i>M. Doi</i> | 1329 |

5.3. Quasicrystals

| | | |
|---|---|------|
| Phase Transformations of Decagonal Quasicrystals. | <i>W. Steurer</i> | 1333 |
| <i>In-Situ</i> X-ray Diffraction Study on Stability of Quasicrystals under High Pressures | <i>M. Hasegawa, A. P. Tsai, T. Kondo, T. Yagi and T. Kikegawa</i> | 1337 |
| Phase Transformations in Decagonal Al-Co-Ni Quasicrystals Studied by TEM | <i>S. Ritsch, K. Hiraga, T. Gödecke and R. Lück</i> | 1341 |
| Formation of Porous Structure and Metallic-Covalent Bonding Conversion under Crystal-Quasicrystal Transformation. | <i>K. Kirihara, T. Kurahashi and K. Kimura</i> | 1345 |
| Characterisation of Quasicrystalline and Crystalline Forms of the T Phase in Isothermally Aged Al-Mg-Ag Alloys. | <i>M. Kubota, J. F. Nie and B. C. Muddle</i> | 1349 |
| Melting Temperature of Lead Nanoparticles Embedded in Al-Cu-V Amorphous and Quasicrystalline Matrix. | <i>A. Singh and A. P. Tsai</i> | 1353 |

5.4. Phase Transformations in Inorganic and Organic Materials

| | | |
|---|---|------|
| *Polymorphic Phase Transformations in Al ₂ O ₃ | <i>T. Gemming, D. R. Clarke and M. Rühle</i> | 1357 |
| Electronic and Magnetic Properties of (La-Dy) _{1-y} A _y MnO ₃ (A; Ca ²⁺ (y=0.3), Sr ²⁺ (y=0.5)). | <i>T. Terai, T. Kakeshita, T. Fukuda, T. Saburi, N. Takamoto, K. Kindo and M. Honda</i> | 1365 |
| Phase Separation and Magnetic Flux Pinning in Nd123 Superconductor. | <i>K. Osamura, S. Miyata, J. Suzuki, K. Kuroda and N. Koshizuka</i> | 1369 |
| Nonlinear Susceptibility and Resistivity at the Intergrain Ordering of Superconductive Ceramics. | <i>M. Matsuura, M. Hagiwara and T. Yamao</i> | 1373 |
| *Solid-Solid Phase Transformation in Soft Matters: Thermoreversible Transformation between BCC-Spheres and Hexagonal Cylinders in Block Copolymers. | <i>T. Hashimoto, K. Kimishima and T. Koga</i> | 1377 |
| Electron Microscopic Studies of Phase Transformations in Rapidly Solidified Ceramics. | <i>K. Kuroda, T. Takeuchi and H. Saka</i> | 1385 |
| Anisotropic Feature of Antiphase Domain Boundaries in Tetragonal Zirconia | <i>N. Shibata, J. Katamura, Y. Zkuhara and T. Sakuma</i> | 1389 |
| On the Coalescence, Twinning and Solid Solution of CeO ₂ -ZrO ₂ Condensates | <i>W.-H. Lee and P. Shen</i> | 1393 |

*invited paper

| | |
|---|---|
| Phase Transition of (Nb, Sm)AlO ₃ | <i>H. Horiuchi, A. Saitow, M. Tanaka, S. Toetsu, A. Yoshikawa, T. Fukuda and T. Mizota</i> 1397 |
| Effect Of Zr ⁴⁺ and Y ³⁺ Dissolution on Spinel Formation from Co _{1-x} O | <i>K.-T. Lin and P. Shen</i> 1401 |
| Exsolution of Monoclinic Iron Zirconate in Fe ₂ O _{3-x} Oversaturated with Zr ⁴⁺ | <i>M.-L. Wu, P. Shen and D. Gan</i> 1405 |
| Ordering/Displacive Phase Transformations in Ca ₄ Nb ₂ O ₉ | <i>I. Levin, L. A. Bendersky, R. S. Roth and T. A. Vanderah</i> 1409 |
| Formation of Gradient Structures in Cemented Carbides | <i>M. Ekroth and J. Ågren</i> 1413 |
| Mesoscopic Phase Transformation in In ₂ Te ₃ Compound Semiconductor | <i>S. Abe, Y. Nakamura and O. Nittono</i> 1417 |
| Conversion of Dry Gels to Zeolites | <i>M. Matsukata, P. R. H. P. Rao, T. Osaki, M. Ogura and E. Kikuchi</i> 1421 |
| Crystalline Phase Control of ZnS Nanocrystallites by Surface Modification with Organic Molecules. | <i>K. Murakoshi, H. Hosokawa and S. Yanagida</i> 1425 |
| Phase Transitions in Nylon Crystals. | <i>H. Zshikawa, T. Ztoh and M. Hashimoto</i> 1429 |
| Phase Transformation Seen through “Millikelvin-Stabilized Cell”-Detection of “Multistage Transformation” in a Small Temperature Range | <i>K. Tozaki, Y. Yoshimura, A. Kojima, C. Ishii, O. Zzuhara, K. Yamada, S. Koyama and H. Zwasaki</i> 1433 |
| Phase Transformation of C ₆₀ Doped into Ceramics and Metals. | <i>K. Miyazawa, J. Yano, Y. Kawazoe, T. Kuzumaki, I. Honma, M. Akaishi and K. Zto</i> 1437 |
| A Review of Some Solid-Solid Transformations in Geology. | <i>B. Guy</i> 1441 |

VI. Phase Transformations in Industrial Alloys

6.1. Phase Transformations in Steels

| | |
|---|---|
| *Kinetics of Simultaneous Transformations. | <i>H. K. D. H. Bhadeshia</i> 1445 |
| *Solute-Drag(-Like) Effects on the Growth of Ferrite in Fe-C-X Alloys. | <i>M. Enomoto, M. Kagayama, N. Maruyama and T. Tarui</i> 1453 |
| Analysis of the Solute Drag-Like Effect on Thickening Kinetics of Grain Boundary Ferrite Allotriomorphs in Fe-C-Mo Alloys | <i>G. R. Purdy, W. T. Reynolds, Jr. and H. I. Aaronson</i> 1461 |
| Solute Drag Effect on Moving Phase Interface during Diffusional Transformation of Fe-X-C. | <i>M. Suehiro</i> 1 4 6 5 |
| Three Dimensional Reconstruction and Classification of Ferrite Precipitates | <i>G. Spanos and M. V. Kral</i> 1469 |
| Microstructural Modelling of Austempered Ductile Iron. | <i>J. S. James and R. C. Thomson</i> 1473 |

*invited paper

| | | |
|---|---|------|
| Formation of Acicular Ferrite in C-Mn Steels Promoted by Vanadium Alloying Addition. | <i>M. Zhang, K. He and D. V. Edmonds</i> | 1477 |
| The Formation of Abnormal Ferrite in Hyper-eutectoid Steels | <i>D. V. Edmonds and T. Chairuangstri</i> | 1481 |
| Transformation Kinetics of a High Silicon Austempered Ductile Iron | <i>J. Mallia, M. Grech and R. E. Smallman</i> | 1485 |
| Orientation Relationships between Ferrite and Cementite in Steels | <i>M.-X. Zhang and P. M. Kelly</i> | 1489 |
| On the Growth Morphology of Widmanstätten Cementite in Steels | <i>F. A. Khalid and D. V. Edmonds</i> | 1493 |
| Relating the Crystallography and Morphology of Proeutectoid Widmanstätten Cementite Precipitates. | <i>M. V. Kral, M. A. Mangan and G. Spanos</i> | 1497 |
| Influence of Ferrite Volume Fraction, Grain Size and Chemical Compositions on Pearlite Transformation Behavior in Si-Containing Low Carbon Steel. | <i>Y. Takahashi, O. Kawano and J. Wakita</i> | 1501 |
| Rapid Austenitization of an 0.7C Spheroidized Steel. | <i>R. Taillard and W. Kaluba</i> | 1505 |
| Dissolution of Cementite into Austenite during Ultra Rapid Heating | <i>M. Umemoto, Z. G. Liu, K. Tsuchiya, Y. Kusunoki, Y. Misaka and K. Kawasaki</i> | 1509 |

6.2. Phase Decomposition and Precipitation in Steels

| | | |
|---|--|------|
| TEM Characterisation of Microstructures Formed in Discontinuously Cooled C-Mn-Si(-Nb) Steels. | <i>E. V. Pereloma, I. B. Timokhina and P. D. Hodgson</i> | 1513 |
| Bainite Transformation of Deformed Austenite in Low Carbon Steels. | <i>K. Fujiwara, S. Okaguchi and H. Ohtani</i> | 1517 |
| Austenite Decomposition Kinetics in Advanced Low Carbon Steels. | <i>M. Militzer</i> | 1521 |
| Deformation Induced Ferrite Transformation from Unstable Austenite | <i>J. Y. Cho, D. W. Suh and H.-C. Lee</i> | 1525 |
| Ferrite Transformation Behavior during Heavy Deformation in Plain Low Carbon Steels. | <i>D.-H. Seo, S. W. Lee and W. Y. Choo</i> | 1529 |
| Effects of Strain Rate and Deformation Temperature on Fine Ferrite Grain Structure Formed from Heavily Deformed Austenite | <i>S. Torizuka, O. Umezawa, K. Nagai, K. Tsuzaki, S. Genda and Y. Kogo</i> | 1533 |
| Orientational Morphology of Low Carbon Steel Rolled in Nonrecrystallized Austenite Region. | <i>S. Matsuoka, K. Sakata, O. Furukimi and T. Obara</i> | 1537 |
| Local Approach for Phase Transformation Modelling Applied to Hot Rolled Steels | <i>T. lung, D. Grandemange, M. Kandel and H. Tsukahara</i> | 1541 |
| Effect of New Heat Treatments on the Mechanical Properties of Low Alloy High Strength Steels. | <i>A. R. Mirak and M. N. Ahmadabadi</i> | 1545 |
| Microstructural Characteristics of Cementite in Tempered Martensite Derived from Strain-Hardened Austenite. | <i>T. Hara, S. Yusa and K. Tsuzaki</i> | 1549 |
| Precipitation Hysteresis of $Ti_4C_2S_2$ in Titanium Interstitial-Free Steels. | <i>R. A. Hubert, G. Dupuis and R. Taillard</i> | 1553 |

*invited paper

| | | |
|---|---|------|
| Characterization of Clustering in IF Steels by Thermodynamic Response Measurements. | <i>S. Saimoto, J. N. A. Starling, B. J. Diak, J. D. Boyd</i> | 1557 |
| An Analytical Transmission Electron Microscope Study of Inclusions in C-Mn Steel Weld Metals. | <i>E. S. K. Menon, M. Saunders, J. Walters, A. G. Fox and G. M. Evans</i> | 1561 |
| Thermo-Chemical-Mechanical Effects on Microstructure Development in Low-Alloy Steel Welds. | <i>S. S. Babu, S. A. David and J. M. Vitek</i> | 1565 |
| Effect of Uniformly Dispersed Oxide Precipitates on Enhancement of Intragranular Ferrite Formation in Heat Affected Zone of Welding Steels. | <i>H. Nakajima, K. Nagai, K. Tsuzaki and S. Torizuka</i> | 1569 |
| Quantification of Inclusion-Stimulated Ferrite Nucleation in Wrought Steel using the SEM-EBSD Technique. | <i>C. van der Eijk, Ø. Grong and J. Hjelen</i> | 1573 |
| Formation of a Subnanostructured Phase Near a Crack in a Steel Subjected to Rolling Contact Fatigue under Severe Conditions. . . | <i>A. Muroga, T. Yasui and H. Saka</i> | 1577 |

6.3. Microstructure in Special Steels

| | | |
|---|--|------|
| *Directional Solidification and Solid State Transformation in an Fe-Cr Alloy | <i>W. Kurz and M. Lima</i> | 1581 |
| On the Formation of σ -Phase in Austenitic Stainless Steels | <i>M. Schwind and J. Ågren</i> | 1589 |
| Strain Hardening and Uniform Elongation of 18% Ni 350 Grade Maraging Steel. | <i>M. Farooque, A. ul Haq and A. Q. Khan</i> | 1593 |
| Martensitic Transformation Induced by Precipitation of Vanadium Carbide in Austenitic Steel. | <i>Y. Haruna, T. Morishita, A. Yamamoto and H. Tsubakino</i> | 1597 |
| Microstructure and Strengthening Mechanism of Cu Bearing High Cr Martensitic Steels. | <i>Y. Futamura, T. Tsuchiyama and S. Takaki</i> | 1601 |
| Phase Transformations in AISI 410 Stainless Steel | <i>J. R. Yang, M. C. Tsai, J. S. Du and Y. J. Lin</i> | 1605 |
| Studies of Phase Transformations Occuring in Conventional, Low Activation (LA) and Oxide Dispersion Strengthened (ODS) 7-11%Cr-(Mo, W, V, Nb, Ta) Martensitic Steels. | <i>J.-C. Brachet, V. Lambard and A. Alamo</i> | 1609 |
| Variants of $M_{23}C_6$ Type Carbide Precipitate in Deformed High Chromium Martensitic Steel. | <i>T. Tsuchiyama and S. Takaki</i> | 1613 |
| Stability of γ Phase and Mechanical Properties in Low Carbon-13Cr-Ni-Mo-Cu Steel. | <i>G. Shigesato, M. Sugiyama, T. Hara and H. Asahi</i> | 1617 |
| Austenite Formation and Stability in 9-12% Chromium Steels with Microduplex Structure. | <i>U. E. Klotz, P. Ernst, P. J. Uggowitzer and M. O. Speidel</i> | 1621 |
| Microstructure Formation in δ/γ Duplex Phase Stainless Steel during Isothermal Ageing and Continuous Heating. | <i>S. Kobayashi, K. Nakai and Y. Ohmori</i> | 1625 |
| Effect of Austenite Destabilisation Heat Treatment on Graphite Precipitation in Chromium Iron. | <i>J. Lecomte-Beckers, L. Terziev and J. P. Breyer</i> | 1629 |
| Surface Hardening of 18%Ni 350 Grade Maraging Steel. | <i>S. Qaisar, M. Farooque, A. ul Haq and A. Q. Khan</i> | 1633 |

*invited paper

| | | |
|--|---|------|
| High Temperature Sulphidation of Commercial Cr-Mn Steel in H ₂ /H ₂ S at 1073–1273 K. | <i>Z. Żurek, J. Łaskawiec, M. Danielewski and M. Hetmańczyk</i> | 1637 |
| Reversion from Eutectoid Structure to Austenite in High Manganese Austenitic Steels. | <i>Y. Ono, T. Tsuchiyama and S. Takaki</i> | 1641 |
| Precipitation Sequences of γ' , ϵ and η Phases in Fe-Ni-Co-Nb Based Superalloys. | <i>K. Kusabiraki, H. Toda, H. Komatsu and S. Saji</i> | 1645 |
| Nano-Crystalline Structure Formation in Mechanically Milled 304L Steel by Reversion of Deformation-Induced Martensite. | <i>R. Zhibashi, T. Kamino, T. Abe and Y. Aono</i> | 1649 |
| Application of Magnetic Transformation to Implant Materials for Hyperthermia of Cancer. | <i>T. Shimizu and M. Matsui</i> | 1653 |

Reports of Discussions in Focus Groups

| | | |
|--|------------------------|------|
| Focus Groups. | <i>T. Mohri</i> | 1659 |
| Modeling Phase Separation in Coherent Alloys with Elastic Misfit. | <i>P. Fratzl</i> | 1661 |
| Time Evolution and Precursor Phenomena Related to Displacive Transformation. | <i>T. Kakeshita</i> | 1663 |
| On Bridging the Gap between <i>ab initio</i> Phase Diagram Calculations and Empirical Thermodynamic Assessments. | <i>S. G. Fries</i> | 1665 |
| Application of Advanced Small-Angle Scattering Techniques to Phase Transformation Phenomenon. | <i>K. Osamura</i> | 1668 |
| Atomistic and Phase Field Simulations of Materials Evolution and Properties | <i>P. E. A. Turchi</i> | 1671 |
| Phase Transformation in Extreme Conditions Learned from Geology. | <i>B. Guy</i> | 1674 |
| Author Index. | | 1677 |
| Subject Index. | | 1683 |

*invited paper