

## Table of Contents

### Preface

### Plenary Lectures

<b>Recent Advances in the Simulation of Recrystallization and Grain Growth</b> G. Gottstein, L.S. Shvindlerman, M. Crumbach and L.A. Barrales-Mora	1 3
<b>Deformation Substructures and Recrystallisation</b> W.B. Hutchinson	13
<b>Role of Heavy Deformation in Thermomechanical Processing on the Formation of Ultrafine-Grained Structure in Steels</b> T. Maki	23
<b>An Overview of Accomplishments and Challenges in Recrystallization and Grain Growth</b> A.D. Rollett, A.P. Brahme and C.G. Roberts	33
 <b>I. Static Recovery, Recrystallization and Related Properties</b>	
43	
<b>Relation between Initial Texture and Microstructure and Nucleation and Growth Mechanisms in Metals</b> B. Bacroix, R. Brenner, K. Zhu, H. Réglé, A. Wauthier, D. Chaubet and O. Castelnau	45
<b>Boundary Mobilities during Recovery and Recrystallization of Binary Al - Mn Alloys</b> F. Barou, A. Guillotin, C. Maurice, J.M. Feppon and J.H. Driver	53
<b>The Development of Homo and Heterogeneous Rolling Microstructures in Rolled Low Carbon and Interstitial-Free Steel</b> B.J. Duggan, M.Z. Quadir, Y.Y. Tse, K. Shen, G.L. Liu and Q.Z. Chen	61
<b>Relation between Ridging and Texture Components in Al-Mg-Si Alloy</b> K. Ikeda, T. Yoshihara, N. Takata and H. Nakashima	71
<b>Texture Development in 6000 Series Al-Mg-Si Alloys for Car Body Panels</b> H. Inagaki	77
<b>Misorientation Aspects of Growth during Recrystallization</b> D. Juul Jensen, D.J. Rowenhorst and S. Schmidt	85
<b>Effect of Stacking Fault Energy on Evolution of Recrystallization and Grain Growth Textures of Metals</b> D.N. Lee	93
<b>Texture Invariant Annealing in Severely Deformed Steel</b> K. Tsuzaki, A. Belyakov and F.X. Yin	101
<b>Effects of Al, Si and Mn on the Recrystallization Behaviors of Fe Containing 70B Brass</b> G.H. Akbari, H. Abbaszadeh and H.G. Ravandi	107
<b>Microstructure Refinement of a Low Interstitial Ferritic Stainless Steel by Cold Rolling and Annealing of Martensite</b> H. Azizi-Alizamini, C.W. Sinclair, M. Militzer and J.D. Mithieux	113
<b>Recovery in 15%Cr Ferritic Stainless Steel after Large Strain Deformation</b> A. Belyakov, K. Tsuzaki, Y. Kimura and Y. Mishima	119
<b>Recrystallization of Niobium Single Crystals Deformed by ECAE</b> H.H. Bernardi, H.R.Z. Sandim, B. Verlinden and D. Raabe	125
<b>Recrystallization Behaviour of Cold Rolled Aluminum Alloy AA 3103 in a Magnetic Field</b> S. Bhaumik, X. Molodova, D.A. Molodov and G. Gottstein	131
<b>Recrystallization Behaviour of an Austenitic High Mn Steel</b> L. Bracke, K. Verbeken, L.A.I. Kestens and J. Penning	137
<b>The Effect of Restoration Process on the Mechanical Behavior of Ultra-Fine Grain Size Nb-Ti Steel Processed by Warm Rolling and Sub and Intercritical Annealing</b> D.B. Santos, L.H.R. Braga, G.G. Lourenço and H.R. da Silva	143

<b>Recovery and Recrystallization as a Function of Deformed Microstructure Orientation in Coarse Grained Cold-Rolled Ni</b>	149
H.S. Chen, A. Godfrey, N. Hansen and Q. Liu	
<b>Understanding a Microstructure Using GOS (Grain Orientation Spread) and Its Application to Recrystallization Study of Hot Deformed Al-Cu-Mg Alloys</b>	153
S.W. Cheong and H. Weiland	
<b>Microstructure and Mechanical Properties of ZK60 Alloy Sheets during Aging</b>	159
J.H. Cho, Y.M. Jin, H.W. Kim and S.B. Kang	
<b>Texture and Microstructure Evolution of Gold Sheet during Deformation and Annealing</b>	165
J.H. Cho, S.H. Choi and K.H. Oh	
<b>Simulation of Primary Recrystallization in Automotive Steels by Consideration of Particle Pinning</b>	
S.H. Choi, B.J. Kim, S.I. Kim, J.W. Choi and K.G. Chin	171
<b>Texture and Boundary Characteristics of Severely Deformed and Recrystallized Copper</b>	
C.H.J. Davies, W.Q. Cao, C.F. Gu, R. Lapovok and E.V. Pereloma	177
<b>Rotated Grains during Recrystallization in Heavily Cold-Rolled Ni<sub>3</sub>Al Single Crystals</b>	
M. Demura, Y. Xu, K. Kishida and T. Hirano	183
<b>Submicrocristalline Structure in Copper after Different Severe Plastic Deformation Schemes</b>	
S.V. Dobatkin, G.A. Salishchev, A.A. Kuznetsov and T.N. Kon'kova	189
<b>The Effect of Grain Size and Rolling Reduction on the Texture Development of a Metastable Austenitic Stainless Steel</b>	
S.Y. Han, R.L. Higginson and E.J. Palmiere	195
<b>Nanostructured Aluminium - Recovery and Recrystallization</b>	
N. Hansen, X. Huang and A. Godfrey	201
<b>Recrystallization Textures of Al-Mg-Si Alloy Sheets Produced by Symmetric and Asymmetric Combination Rolling</b>	
H. Inoue, M. Hori, T. Komatsubara, H. Tanaka and T. Takasugi	207
<b>Annealing Effects on Mechanical Properties and Microstructure of AZ31 Alloy Sheet Differential-Speed-Rolled at Low Temperatures</b>	
Y.G. Jeong, W.J. Kim, S.G. Choi and H.G. Jeong	213
<b>Comparison of Grain Structures and Textures in AA5754 Aluminum Alloy Sheets Processed by Room Temperature Rolling and Rolling with Liquid Nitrogen</b>	
H.O. Jin, P.D. Wu and D.J. Lloyd	217
<b>In Situ EBSP Observations of Recrystallization in Commercial Purity Aluminum</b>	
K. Kajihara	223
<b>Anomalous Rolling and Annealing Textures of Cold Rolled Copper Foils</b>	
S.H. Kim, S.Z. Han, C.J. Kim, S.Y. Ok, I.Y. Hwang and F.X. Yin	229
<b>Microstructure Control Using Recrystallisation in Particle-Containing Fe<sub>3</sub>Al Alloys</b>	
S. Kobayashi and S. Zaefferer	235
<b>The Evolution of Texture and Stored Energy during Recrystallization of IF High Strength Steel Investigated by Means of Orientation Imaging Microscopy</b>	
K.Y. Lee, G.S. Kim, K.G. Chin and L.A.I. Kestens	241
<b>Recrystallisation at Intercritical Annealing in Low Carbon Steels</b>	
N. Maruyama, T. Ogawa and M. Takahashi	247
<b>Influence of Nb Stabilization on the Recovery and Recrystallization Kinetics of a Ferritic Stainless Steel: Consequences on Magnetic Losses</b>	
N. Meyer, Y. Bréchet, M. Véron, M. Mantel, P.E. Dubois and O. Geoffroy	253
<b>On the Thermal Stability of ECAP Deformed FCC Metals</b>	
X. Molodova, G. Gottstein and R.J. Hellmig	259
<b>Rate of Change of Boundary Area in Coarsening Three Dimensional Cellular Structures</b>	
A. Morawiec	265
<b>The Effect of Dislocations in Grains on Texture Formation in Strain Induced Boundary Migration</b>	
K. Murakami, T. Kubota, F. Grégori and B. Bacroix	271
<b>Grain Boundary Bulging during Tempering in Lath-Martensitic Steel</b>	
M. Natori, T. Tsuchiyama and S. Takaki	277

<b>Nucleation of Recrystallization in Cu-8%at. Al Alloy Studied by Orientation Mapping in TEM</b>	
H. Paul, A. Morawiec, E. Bouzy and M. Darrieulat	283
<b>Activated Slip Systems and Nucleation of Recrystallized Grains in Aluminium Deformed in Channel-Die</b>	
H. Paul and J.H. Driver	289
<b>Texture Evolution during Annealing of Warm Rolled Cr-Containing Low Carbon Steels</b>	
E.V. Pereloma, A. Gazder, J.J. Jonas and C.H.J. Davies	295
<b>Effect of Changing Homogenization Treatment on the Particle Structure in Mn-Containing Aluminium Alloys</b>	
T. Pettersen, Y.J. Li, T. Furu and K. Marthinsen	301
<b>Processing of Multi-Layered Al-Al(Sc) Hybrid Sheet by Accumulative Roll Bonding</b>	
M.Z. Quadir, O. Al-Buhamad and M. Ferry	307
<b>Recrystallization Behavior of the Nickel-Based ODS Superalloy PM 1000</b>	
H.R.Z. Sandim, A.O.F. Hayama and D. Raabe	313
<b>Radiation-Induced Recrystallization of U-Mo Fuel Particles and Radiation-Induced Amorphization of Interaction Products in U-Mo/Al Dispersion Fuel</b>	
H.J. Ryu, Y.S. Kim, G.L. Hofman, J. Rest, J.M. Park and C.K. Kim	319
<b>Stored Energy Characterization after Low Deformation by Rolling or Tension of an IF-Ti</b>	
A. Samet-Meziou, A.L. Etter, T. Baudin and R. Penelle	323
<b>Local Microstructure Control of Pure Aluminum Utilizing Fiber-Laser Aided Spot Heating System</b>	
T. Shibayanagi, M. Tsukamoto, N. Abe, T. Matsumoto and Y. Soga	329
<b>On the Recrystallisation Characteristics and Kinetics of a 9SMn28 Free Cutting Steel</b>	
M.C. Somaní, L.P. Karjalainen and J.H. Bianchi	333
<b>Recovery of Gypsum from Waste Plaster Board by Recrystallization Process</b>	
Y.J. Song and G.S. Lee	339
<b>3D Spatial Distribution of Nuclei in 90% Cold Rolled Aluminium</b>	
Z. Sükösd, K. Hannesson, G.L. Wu and D. Juul Jensen	345
<b>In Situ EBSP Analysis of Grain Boundary Migration during Recrystallization in Pure Aluminum Foils</b>	
N. Takata, K. Ikeda, H. Nakashima and N. Tsuji	351
<b>Low Temperature Recrystallization of High Purity Iron Severely Deformed by ARB Process</b>	
D. Terada, B.L. Li, M. Sugiyama and N. Tsuji	357
<b>Recrystallization Deformation of Austenite, Microstructure of Martensite and Property of Rolled Steel Products</b>	
A. Traino, A. Baschenko, V. Ivoditov, A. Zavrazhnov and V. Knokhin	363
<b>Model Alloys to Study the Solute Drag and Precipitation Effect on the Recrystallization Kinetics of Nb-Microalloyed Steels</b>	
S. Vervynckt, P. Thibaux, M. Liebeherr and Y. Houbaert	369
<b>Abnormal Subgrain Growth by Monte Carlo Simulation Based on Hot-Rolled AA5005 Aluminum Alloy Texture</b>	
S.Y. Wang and A.D. Rollett	377
<b>The Role of Zirconium Additions in Recrystallization of Aluminum Alloys</b>	
H. Weiland and S.W. Cheong	383
<b>Mapping Partially Recrystallised Structures by 3DXRD</b>	
S.S. West, G. Winther, L. Margulies, E. Knudsen, H.O. Soerensen, S. Schmidt and D. Juul Jensen	389
<b>Effect of Annealing Temperature on Recrystallisation in Al (AA1200) Cold Rolled to a True Strain of 4</b>	
G.L. Wu and D. Juul Jensen	395
<b>Effects of High Magnetic Field and Field Direction on Recrystallization and Recrystallization Texture in Cold-Rolled IF Steel Sheet</b>	
Y. Wu, C.S. He, X. Zhao, L. Zuo and T. Watanabe	401
<b>An Analysis of Strain Path Effects on Static Recrystallisation in Hot Worked Aluminium Alloy AA5052 Using Forward and Reverse Torsion</b>	
B.P. Wynne, O. Hernandez-Silva, M. Lopez-Pedrosa and W.M. Rainforth	407

<b>Application of FIB-EBSD Tomography for Understanding Annealing Phenomena in a Cold Rolled Particle-Containing Nickel Alloy</b>	413
W.Q. Xu, M. Ferry, J.M. Cairney and J.F. Humphreys	
<b>Recrystallization Behaviour of Cold Rolled Low Carbon Steel Strip with Various Starting Microstructures</b>	419
W.Q. Xu and M. Ferry	
<b>Effect of Niobium Addition on the Texture Formation of High Strength Cold-Rolled Low Carbon Steel Sheets</b>	425
H. Yoshida, K. Okuda, H. Kawabe, T. Urabe, Y. Tanaka and Y. Hosoya	
<b>II. Dynamic Recovery, Recrystallization and Elevated Temperature Deformation</b>	
	431
<b>Grain Size in Mg Alloys: Recrystallization and Mechanical Consequences</b>	
M.R. Barnett, D. Atwell and A.G. Beer	433
<b>Understanding Dynamic Recrystallization Behavior through a Delay Differential Equation Approach</b>	
J.K. Lee	441
<b>Dynamic Recrystallization in Copper and Copper-Tin Alloys</b>	
D.T. McDonald, J.F. Humphreys, P.S. Bate and I. Brough	449
<b>Nucleation of Dynamic Recrystallization at the Grain Boundaries of Copper Bicrystals</b>	
H. Miura, T. Sakai, R. Mogawa and J.J. Jonas	457
<b>Atomistic Processes of Phase Transformation and Dynamic Recrystallization during Hot-Working of Intermetallic Titanium Aluminides</b>	
F. Appel, M. Oehring and J.H.D. Paul	465
<b>Formation of Ultrafine Ferrite Grains during Interrupted Multi-Pass Deformation under Hot Torsion</b>	
R. Barbosa, D.B. Santos and R.E. Lino	471
<b>Dynamic Recrystallization Mechanisms on Spot Welding of 6008 Aluminium Alloy to Steel by Friction Stir Welding</b>	
S. Bozzi, A.L. Etter, T. Baudin, A. Robineau and J.C. Goussain	477
<b>Investigation of Retained Strains during Multipass Deformation</b>	
M. Candic, B.H. Tian, S. Kleber, M. Wießner and C. Sommitsch	485
<b>Recrystallization Characteristics of Commercially Pure Titanium Rolled at Elevated Temperatures</b>	
Y.B. Chun and S.K. Hwang	491
<b>Effect of Warm Deformation on Ferrite Microstructure Evolution in a Ti-Microalloyed Steel</b>	
B. Eghbali	497
<b>Microstructure Evolution during Warm Deformation of Low Carbon Steel with Dispersed Cementite</b>	
J. Gallego, A.M. Jorge and O. Balancin	505
<b>Effects of Precipitation during Dynamic Recrystallization of Copper with Different Oxygen Levels</b>	
V.G. García, J.M. Cabrera and J.M. Prado	511
<b>Modelling Dynamic Recovery and Recrystallization of Metals by a New Non-Equilibrium Thermodynamics Approach</b>	
M.X. Huang, P.E.J. Rivera-Díaz-del-Castillo and S. van der Zwaag	517
<b>Microstructural Evolution Deformed Heavily by High Strain Rate at High Temperature Range in Ultra Low Carbon Steel</b>	
J.H. Kang, S. Torizuka and T. Hanamura	523
<b>Effect of Initial Lamellar Structure on Globularization of Hot Multi-Forged ELI Grade Ti-6Al-4V Alloy</b>	
J.Y. Kim, I.O. Shim and S.H. Hong	529
<b>Boundary Migration Induced Plasticity during Recrystallization and Growth under Applied Stress</b>	
S.J. Kim, Y.G. Cho, D.W. Suh, S.J. Kim, G.S. Kim and H.N. Han	533

<b>Formation of Ferrite-Cementite Ultrafine Grained Microstructure by Warm Compression for SM490 Martensite Steel</b>	539
J.H. Li, P.G. Xu, Y. Tomota and Y. Adachi	
<b>Effect of Deformation Temperature on Microstructure Evolution in 2219 Aluminum Alloy during ECAP</b>	545
I. Mazurina, O. Situdikov, R. Kaibyshev, H. Miura and T. Sakai	
<b>Effect of Grain Boundary Migration on Texture Formation in Al-3mass%Mg Solid Solution during High Temperature Deformation</b>	551
K. Okayasu, H. Takekoshi and H. Fukutomi	
<b>Formation of Ultrafine Grained Ferrite by Warm Deformation of Tempered Lath Martensite in Low Alloy Steels</b>	557
B. Poorganji, T. Yamaguchi, T. Maki, G. Miyamoto and T. Furuhara	
<b>Modelling of the Dynamic Processes of Structure Formation by Macroscopic Parameters of Plastic Deformation</b>	563
L. Ryabicheva and D. Usatyuk	
<b>Microstructural Evolution in a Commercial Al-Mg-Sc Alloy during ECAP at 300°C</b>	569
O. Situdikov, T. Sakai, E. Avtokratova, R. Kaibyshev, K. Tsuzaki and Y. Watanabe	
<b>Influence of Dynamic Recrystallisation on Texture Formation in ECAP deformed Nickel</b>	575
W. Skrotzki, B. Klöden, I. Hünsche, R. Chulist, S. Suwas and L.S. Tóth	
<b>Recrystallisation, Structure, Texture and Properties of Pipe Steel Rolled at Wide Temperature Range</b>	581
V.I. Slavov, N.A. Popkova and S.Y. Betsofen	
<b>An Investigation of Microstructure Inhomogeneity in Waspaloy Subjected to Plane Strain Compression Testing</b>	589
M.J. Thomas, B.P. Wynne, E.J. Palmiere, K.P. Mingard and B. Roebuck	
<b>Relationship between Grain Boundary Diffusion and Ferrite Grain Size Formed through Dynamic Recrystallization during Large Strain Deformation</b>	595
S. Torizuka and S.V.S.N. Murty	
<b>Effect of Carbon Addition on Ultrafine Grained Microstructure Formation by Warm Compression for Fe-18Ni Alloys</b>	601
P.G. Xu, J.H. Li, Y. Tomota and Y. Adachi	
<b>Effect of Austenite as a Harder Second Phase on Ferrite Substructure Evolution by Intercritical Rolling</b>	607
T. Yokota, H. Ohtsubo and S. Endo	
<b>Influence of Thermal Condition of ECAP on Microstructure Evolution in Low Carbon Steel</b>	611
J. Zrník, S.V. Dobatkin and L. Kraus	
<b>Dynamic Recrystallization of Ferrite in Low Carbon Steels</b>	617
Z.Q. Sun, L.F. Li and W.Y. Yang	

### III. Grain Growth and Related Properties

<b>Kinetics of a Grain in a Textured Matrix</b>	623
M.E. Glicksman, P.R. Rios and D. Lewis	
<b>Effects of Grain Boundary Characters for Secondary Recrystallisation in Grain Oriented Silicon Steel</b>	625
H. Homma, K. Murakami, T. Tamaki, N. Shibata, T. Yamamoto and Y. Ikuhara	
<b>Orientation Distribution of <math>\Sigma 3</math> Grain Boundary Planes in Ni before and after Grain Boundary Engineering</b>	633
H.M. Miller, C.S. Kim, J. Gruber, V. Randle and G.S. Rohrer	
<b>Magnetically Affected Recrystallization and Grain Growth in Non-Ferromagnetic Metals</b>	641
D.A. Molodov	
<b>Recrystallisation, Grain Growth and Texture Evolution in Nonoriented Electrical Steels</b>	649
J.T. Park, J.K. Kim and J.A. Szpunar	
<b>Topological Approach to Abnormal Grain Growth in three Dimensions</b>	657
P.R. Rios and M.E. Glicksman	
<b>Novel Approaches to the Thermodynamics of Grain Boundaries and Grain Boundary Junctions</b>	665
L.S. Shvindlerman and G. Gottstein	

<b>Controlling the Growth of Cu Particles through Semibatch Process</b>	683
J.G. Ahn, D.J. Kim, Y.N. Jang, C.O. Kim, H.S. Chung and H.T. Hai	
<b>Ferrite Grain Refinement during Hot Rolling of Seamless Tubes</b>	689
R. Barbosa, D.B. Santos, M.A.C. Ferreira and R.N. Nolasco	
<b>Determination of the Factors Controlling Crystallography Non-Conformance in Single Crystal Turbine Blade Production on an Industrial Scale</b>	695
J. Cameron and P.W. Shelton	
<b>The Effects of Hot Band Annealing Temperature on the Texture of 1% and 2%Si Nonoriented Electrical Steels</b>	701
J.Y. Choi, J.T. Park, B.K. Bae and J.K. Kim	
<b>Processing of FeCo Nanosized Soft-Magnetic Material by Powder Metallurgy Technique</b>	707
W.M. Daoush	
<b>Abnormal Grain Growth in Metals</b>	717
J. Dennis, P.S. Bate and J.F. Humphreys	
<b>An Examination of Cluster Nucleation of Goss Oriented Grains Formed during Secondary Recrystallisation in an Fe-3.2% Si Electrical Steel</b>	723
B.J. Duggan, M.Z. Quadir and R. Penelle	
<b>Statistical Aspects of Grain Coarsening in a Fine Grained Al-Sc Alloy</b>	729
M. Ferry and N. Burhan	
<b>Annealing Behavior during Heating Rate of Ultrafine-Grained 5052 Al Alloy deformed at Cryogenic Temperature</b>	735
U.G. Gang, D.B. Park and W.J. Nam	
<b>Limit for Controlling Stabilization of Cu Powder Prepared from Cu<sub>2</sub>O-H<sub>2</sub>O System</b>	741
H.T. Hai, D.J. Kim, Y.D. Kim, C.O. Kim, H.S. Chung and J.G. Ahn	
<b>Evolution of the Texture on Primary Recrystallization and Grain Growth in Fe-3%Si Steels</b>	747
K.S. Han, J.T. Park, J.K. Kim and J.A. Szpunar	
<b>Three Dimensional Characterization of Grain Structures by EBSP and 3DXRD</b>	751
K. Hannesson and D. Juul Jensen	
<b>Grain Refinement and Mechanical Properties of Magnesium Alloy by Hydrogenation Treatment</b>	757
S. Ishida, M. Noda, K. Funami and H. Mori	
<b>Effect of A-Site Ions Additions on Abnormal Grain Growth and Piezoelectric Properties in NKN-5LT Systems</b>	763
M.S. Kim, S.J. Jeong and J.S. Song	
<b>A Study of Abnormal Behavior of Grain Growth in High-Strength Boron-Added Steel</b>	767
Y.H. Lee, S.Y. Lee and D.L. Lee	
<b>Influence of Localized Primary Recrystallization Texture on Secondary Recrystallized Grains in Fe-3%Si</b>	771
N. Morishige, K. Murakami and H. Homma	
<b>Microstructure of Friction Stir Processed Mg-Y-Zn Alloy</b>	777
T. Morishige, M. Tsujikawa, S.W. Chung, S. Oki and K. Higashi	
<b>Improvement of the Fatigue Characteristic of AZ31 Magnesium Alloy by Microstructures Control</b>	781
Y. Nagata, M. Noda, H. Shimizu, K. Funami and H. Mori	
<b>The Influence of Hot Rolling Finishing Temperature on the Structure and Magnetic Properties of 2.0%Si Non-Oriented Silicon Steel</b>	787
S. Da Costa Paolinelli, M.A. Da Cunha and A.B. Cota	
<b>Fatigue Strength of Friction Stir Welded Aluminum Alloy Joints</b>	793
H.Q. Qu, M. Tsujikawa, S.W. Chung, S. Oki and K. Higashi	
<b>Dynamic Grain and Particle Growth in a Non-Superplastic Al-4Cu Alloy</b>	797
O.V. Rofman and P.S. Bate	
<b>The Effect of Copper Content on the Dynamic Grain Growth in AL-Cu-Zr Systems</b>	803
K. Sotoudeh, P.S. Bate and J.F. Humphreys	
<b>Characteristic Microstructure and Grain Boundary Motion in Secondary Recrystallization of Fe-3%Si Alloys</b>	811
S. Suzuki, S. Takebayashi and Y. Ushigami	
<b>Effect of Processing Order on Strengthening of Friction Stirred Mg-Y-Zn Alloy</b>	817
M. Tsujikawa, M. Tanaka, T. Morishige, S.W. Chung, S. Oki and K. Higashi	

**Generation of Initial Microstructures for Monte Carlo Potts Model Simulations of Quasi-Binary Grain Growth**

Y.B. Zhang, A. Godfrey, M.A. Miodownik, W. Liu and Q. Liu

821

**IV. Grain Boundary/Interface Structure and Microstructure Development**

825

**Principles of Microstructural Design in Two-Phase Systems**

S.J.L. Kang, Y.I. Jung and K.S. Moon

827

**Physical Metallurgical Aspects of Texture Control by Thermo-Mechanical Processing of Low-Carbon Steel Sheet**

L.A.I. Kestens and R.H. Petrov

835

**A New Approach to Grain Boundary Engineering for Photovoltaic Polysilicon by Unidirectional and Rotational Solidification**

T. Watanabe, K. Kido, S. Tsurekawa and K. Kawahara

843

**Grain Boundary Atomic Structures in SrTiO<sub>3</sub> and BaTiO<sub>3</sub>**

T. Yamamoto, T. Mizoguchi, S.Y. Choi, Y. Sato, N. Shibata and Y. Ikuhara

851

**Grain-Growth Phenomena in ZnO-Based Ceramics**

S. Bernik, M. Podlogar, N. Daneu and A. Rečnik

857

**Grain Boundary Character Evolution during Grain Growth in a Zr Alloy**

N. Bozzolo, G. Sawina, F. Gerspach, K. Szwiertnia, A.D. Rollett and F. Wagner

863

**Disruption of Dislocation Cores at Grain Boundary in Nb-Doped SrTiO<sub>3</sub> Bicrystals**

S.Y. Choi, J.P. Buban, N. Shibata, T. Yamamoto and Y. Ikuhara

869

**Microband-To-Microshear Band Transition near Grain Boundaries in BCC Steel**

D. Dorner, Y. Adachi and K. Tsuzaki

873

**Correlation between Boundary Energy and Grain Boundary Character Distribution in Fe-Based Polycrystals**

P. Gobernado, R.H. Petrov and L.A.I. Kestens

879

**Cold-Rolled Micro-Texture in Polycrystalline 3%Si-Fe**

T. Imamura, Y. Hayakawa and M. Muraki

885

**Recovery of HPT-Processed Iron Studied by Orientation Imaging Microscopy**

J. Ivanisenko, A. Minkow, R. Valiev and H.J. Fecht

891

**Effect of Sintering Additive Composition on Grain Boundary Structure in Liquid-Phase-Sintered Silicon Carbide**

Y.W. Kim, J.H. Lee and D.Y. Kim

897

**Faceting and Migration of Low Angle <100> Tilt Grain Boundaries in Pure Aluminum**

D.M. Kirch, B.B. Zhao, D.A. Molodov and G. Gottstein

903

**A Novel Laser Powered Heating Stage for In Situ Investigations in a SEM**

D.M. Kirch, A. Ziemons, I. Lischewski, D.A. Molodov and G. Gottstein

909

**Three-Dimensional Microstructure Reconstruction Using FIB-OIM**

S.B. Lee, A.D. Rollett and G.S. Rohrer

915

**Grain-Boundary Structure and Phase-Transformation Mechanism in Yttria-Stabilized Tetragonal Zirconia Polycrystal**

K. Matsui, H. Yoshida and Y. Ikuhara

921

**Mechanically Driven Migration of <100> Tilt Grain Boundaries in Al-Bicrystals**

D.A. Molodov, T. Gorkaya and G. Gottstein

927

**Comparison of Deformation Structure of Lath Martensite in Low Carbon and Ultra-Low Carbon Steels**

S. Morito, T. Ohba and T. Maki

933

**Direct Measurement of Titanium Pipe Diffusion Coefficients in Sapphire**

T. Nakagawa, I. Sakaguchi, N. Shibata, K. Matsunaga, T. Mizoguchi, T. Yamamoto, H. Haneda and Y. Ikuhara

939

**In Situ Time-Resolved X-Ray Diffraction Investigation of the  $\omega \rightarrow \psi$  Transition in Al-Cu-Fe Quasicrystal-Forming Alloys**

E. Otterstein, R. Nicula, J. Bednarčík, M. Stir and E. Burkel

943

**Faceting of  $\Sigma 3$  Grain Boundaries in Al**

S. Protasova, O.A. Kogtenkova and B.B. Straumal

949

<b>Atomic-Scale Processes of Grain-Boundary Faceting in a Zirconia Bicrystal</b>	955
N. Shibata, F. Oba, T. Yamamoto and Y. Ikuhara	
<b>Grain Growth, Microstructure and Property of Ultrafine WC-Co Alloy by Spark Plasma Sintering</b>	959
L. Sun, C.C. Jia, M. Xian and R.J. Cao	
<b>Role of Grain Boundary Segregation in Austenite Decomposition of Low-Alloyed Steel</b>	965
S. Suzuki and M. Tanino	
<b>Control of Nanointerfaces by Energy Beam Irradiation</b>	971
S. Tanaka	
<b>Microstructure and Magnetic Properties of CoFeHfO Rich Nanocrystalline Thin Films Application for High Frequency</b>	975
L.V. Tho, K.E. Lee, C.G. Kim, C.O. Kim and W.S. Cho	
<b>Dislocation Structure of 10° Low-Angle Tilt Grain Boundary in <math>\alpha\text{-Al}_2\text{O}_3</math></b>	979
E. Tochigi, A. Nakamura, N. Shibata, T. Yamamoto, K.P.D. Lagerlöf and Y. Ikuhara	
<b>Synthesis of Magnesium Oxide Nanoparticles by Sol-Gel Process</b>	983
R. Wahab, S.G. Ansari, M.A. Dar, Y.S. Kim and H.S. Shin	
<b>Grain Boundary Engineering by Application of Mechanical Stresses</b>	987
M. Winning	
<b>High-Resolution Transmission Electron Microscopy Study of WC-Co Alloy doped with other Metal Carbides; VC, <math>\text{Cr}_3\text{C}_2</math>, and ZrC</b>	993
Y. Yamanaka, T. Taniuchi, F. Shirase, T. Tanase, Y. Ikuhara and T. Yamamoto	
<b>Estimation of Grain Boundary Diffusivity in Cation-Doped Polycrystalline Alumina</b>	997
H. Yoshida, K. Morita, B.N. Kim, K. Hiraga, T. Sakuma and T. Yamamoto	

## V. Computer Simulation and Modeling

<b>Theory of Grain Growth in the Presence of Atoms Drag Effects</b>	1003
G.C. Abbruzzese and M. Buccioni	
<b>Phase-Field Simulation of Cooperative Growth of Pearlite</b>	1005
K. Nakajima, Y. Tanaka, Y. Hosoya, M. Apel and I. Steinbach	
<b>Grain Growth in Materials with Mobile Second-Phase Particles</b>	1013
V.Y. Novikov	
<b>Interplay between Surface and Grain Boundary in Sintering</b>	1021
F. Wakai	
<b>A Texture Component Model for Predicting Recrystallization Textures</b>	1029
M. Winning, D. Raabe and A.P. Brahme	
<b>Modeling of Cube-Texture Evolution during Grain Growth in Ni Thick-Films based on Experimental Observations</b>	1035
Y.B. Zhang, A. Godfrey, M.A. Miodownik, W. Liu and Q. Liu	
<b>The Effect of Grain Boundary Junctions on Grain Microstructure Evolution: 3D Vertex Simulation</b>	1043
L.A. Barrales-Mora, L.S. Shvindlerman, V. Mohles and G. Gottstein	
<b>Modeling Recrystallization in Aluminum Using Input from Experimental Observations</b>	1051
A.P. Brahme, J.M. Fridy and A.D. Rollett	
<b>Implementation of Twin Reorientation and Softening Schemes in a Polycrystal Plasticity Model for Mg Alloys</b>	1057
S.H. Choi, Y.S. Song, J.K. Kim, B.J. Jung and Y.B. Park	
<b>Computer Simulations of Kinetics and Texture of Recrystallisation by a 3-D Potts Monte Carlo Model</b>	1063
E. Fjeldberg and K. Marthinsen	
<b>Computer Simulations Combining Finite Difference and Finite Element Methods: Solute Drag on Migrating Grain Boundaries in Three-Dimension</b>	1069
M.C. Gao, J. Gruber, A.D. Rollett and A.P. Kuprat	
<b>Simulation of Recrystallization Using Molecular Dynamics; Effects of the Interatomic Potential</b>	1075
R.B. Godiksen, Z.T. Trautt, M. Upmanyu, S. Schmidt and D. Juul Jensen	
<b>Simulation of Recrystallization Using Molecular Dynamics; Effects of the Interatomic Potential</b>	1081

<b>On the Validation of the Monte Carlo Technique in Simulation of Grain Growth in Small, Two-Dimensional Systems</b>	1087
O. Hunderi, K. Marthinsen and N. Ryum	
<b>Abnormal Grain Growth Induced by Boundary Segregation of Solute Atoms</b>	1093
S.G. Kim, W.T. Kim and Y.B. Park	
<b>Phase Field Model Simulation of Grain Growth in Three Dimensions under Isotropic and Anisotropic Grain Boundary Energy Conditions</b>	1101
K.J. Ko, P.R. Cha, J.T. Park, J.K. Kim and N.M. Hwang	
<b>Recrystallization and Mechanical Properties of Hot Rolled Seamless Steel Tubes</b>	1107
T. Kvačkaj and M. Zemko	
<b>Three Dimensional Monte Carlo Simulation of Isotropic Coarsening of Particles in Liquid Phase</b>	1115
S.B. Lee and A.D. Rollett	
<b>On Strain-Induced Grain Growth Using Modified Monte Carlo Method and Digital Image Correlation Technique</b>	1121
W.L. Lin and J.C. Kuo	
<b>Prediction of the Microstructural Evolution during Hot Strip Rolling of Nb Microalloyed Steels</b>	1127
L. Lissel and G. Engberg	
<b>Numerical Modelling of Plastic Deformation and Subsequent Recrystallization in Polycrystalline Materials, Based on a Digital Material Framework</b>	1133
R.E. Logé, M. Bernacki, H. Resk, H. Digonnet and T. Coupez	
<b>A New Approach to Model Heterogeneous Recrystallization Kinetics Based on the Natural Inhomogeneity of Deformation</b>	1139
H.W. Luo, L.Z. An and H.W. Ni	
<b>Preliminary Simulation for Competing Behaviors between Recrystallization and Transformation in Dual Phase Steels</b>	1145
K. Okuda, H. Yoshida, Y. Nagataki, Y. Tanaka and A.D. Rollett	
<b>Mixed Vertex - Monte Carlo Model of Recrystallization</b>	1151
K. Piękoś, J. Tarasiuk, K. Wierzbowski and B. Bacroix	
<b>Generalized Vertex Model - Study of Recrystallization in Copper</b>	1157
K. Piękoś, J. Tarasiuk, K. Wierzbowski and B. Bacroix	
<b>Modeling the Evolution of Orientation Distribution Functions during Grain Growth of some Ti and Zr Alloys</b>	1163
G. Sawina, F. Gerspach, N. Bozzolo, K. Szwietrzka, A.D. Rollett and F. Wagner	
<b>Modeling Recrystallization of Aluminum Alloys: A Refined Approach to Particle Stimulated Nucleation</b>	1169
C. Schäfer and G. Gottstein	
<b>Simulation of Ideal Grain Growth Using the Multi-Phase-Field Model</b>	1177
P. Schaffnit, M. Apel and I. Steinbach	
<b>Topology Based Growth Law and New Analytical Grain Size Distribution Function of 3D Grain Growth</b>	1183
P. Streitenberger and D. Zöllner	
<b>Phase-Field Modeling of Recrystallization - Effects of Second-Phase Particles on the Recrystallization Kinetics</b>	1189
Y. Suwa, Y. Saito and H. Onodera	
<b>Phase-Field Modeling and Simulation of Nucleation and Growth of Recrystallized Grains</b>	1195
T. Takaki, A. Yamanaka and Y. Tomita	
<b>Modeling Recrystallization for 3D Multi-Pass Forming Processes</b>	1201
M. Teodorescu, P. Lasne and R.E. Logé	
<b>Stored Energy and Recrystallisation in Cold Rolled Steel</b>	1207
K. Wierzbowski, A. Baczmanski, J. Tarasiuk, P. Lipiński, B. Bacroix and A. Lodini	
<b>Coupled Simulation of the Static Recrystallization in Hot Deformed Austenite on Mesoscale</b>	1213
C.W. Zheng, N.M. Xiao, D.Z. Li and Y.Y. Li	
<b>Monte Carlo Potts Model Simulation and Statistical Theory of 3D Grain Growth</b>	1219
D. Zöllner and P. Streitenberger	

## **VI. Recrystallization and Grain Growth in Ceramics and Thin Films**

<b>Diffusion Controlled Abnormal Grain Growth in Ceramics</b>	1225
S.J. Dillon and M.P. Harmer	1227
<b>Effect of the Intercalation of the Carbon Layer on the Kinetics of Grain Growth of FePt Magnetic Thin Film during Ordering Reaction - A Monte Carlo Simulation Study</b>	1237
M.C. Kim, D.A. Kim and J.K. Park	
<b>Characteristic Microstructure Evolution of Polycrystalline Ag Films Prepared from Ink-Jetted Ag Nanoparticle Suspension</b>	1243
J.K. Jung, S.H. Choi, M.J. Jang, J.W. Joung and Y.C. Joo	
<b>Grain Growth Behavior and Characteristics of Multiphase Ceramic Composites Fabricated by Organic-Inorganic Solution Technique</b>	1249
S.J. Lee	
<b>Devitrification and High Temperature Properties of Mineral Wool</b>	1255
E.R. Nielsen, M. Augustesen and K. Ståhl	
<b>Evolution of the Microstructure in Electrochemically Deposited Copper Films at Room Temperature</b>	1261
K. Pantleon and M.A.J. Somers	
<b>Effect of Grain Orientation on the Abnormal Grain Growth with Magetoplumbite Crystal Structure</b>	1265
S.Y. Park, J.H. Song and Y.J. Cho	

## **VII. Nanocrystallization and Grain Growth**

<b>Grain Refinement of High-Purity FCC Metals Using Equal-Channel Angular Pressing</b>	1271
Z. Horita, K. Kishikawa, K. Kimura, K. Tatsumi and T.G. Langdon	1273
<b>Abnormal Grain Growth during Annealing in Nanocrystalline Fe-Ni Alloys</b>	1279
J.H. Seo, J.K. Kim and Y.B. Park	
<b>The Processing of Ultrafine-Grained Materials Using High-Pressure Torsion</b>	1283
C. Xu, Z. Horita and T.G. Langdon	
<b>Effect of Annealing on the Microstructure Change and Strength of Irradiated Quasi-Nano-Filamentary Copper-Silver Composites</b>	1295
K.S. Choi, Y. Choi and H. Inoue	
<b>X-Ray Diffraction Studies of Grain Growth in an Ultra-fine Grained 6060 Aluminium Alloy</b>	1299
B. Forbord, R.H. Mathiesen and H.J. Roven	
<b>Specific Phenomena in Severe Plastic Deformation Processed SUS310S Austenitic Stainless Steel Powder</b>	1305
H. Fujiwara, Y. Iwahashi, K. Ohta and K. Ameyama	
<b>Formation of Ultra Fine Grained Structure during Annealing of Heavily Drawn Metastable Austenitic Steel Wire</b>	1309
T. Fukumaru, T. Inoue, T. Tsuchiya and S. Takaki	
<b>Magnetic and Structural Properties of Nitrified FINEMET Powder Using by Mechanical Milling Method</b>	1313
S.M. Hong, C.G. Kim and C.O. Kim	
<b>Crystallization Behavior and Mechanical Property of Cu Based Metallic Glass Powders</b>	1317
H.S. Kim, J.K. Lee, S.Y. Shin and T.S. Kim	
<b>Synthesis and Structural Characterization of Nanoscale BaTiO<sub>3</sub> Powders</b>	1323
S.M. Moon and N.H. Cho	
<b>Recrystallization Behavior of Nano Grained Cu-Zn Alloy Produced by Multi-Directional Forging</b>	1329
Y. Nakao, H. Miura and T. Sakai	
<b>Removal of Total Organic Carbon from Aqueous Phenol Solution Using Photocatalytic ZnO Nanopowders Prepared by Solution Combustion Method</b>	1335
S. Park, J.H. Lee, K. Yoo, H.J. Park, Y.J. Chung and J.C. Lee	
<b>Nucleation and Grain Growth Kinetics of Amorphous to Nanocrystalline Ceria Solid Solutions</b>	1339
J.L.M. Rupp, B. Scherrer and L.J. Gauckler	

<b>In Situ Annealing of Severe Plastic Deformed OFHC Copper</b>	1345
S. Scheriau, A. Vorhauer and R. Pippin	
<b>Annealing Texture of ECAE Processed Copper</b>	1353
S. Suwas and D.I. Kim	
<b>Growth of Cu-Oxide Protrusion by Ar Ion Irradiation</b>	1359
H. Tanaka and S. Tanaka	
<b>Lattice Relaxation in Ni-P Amorphous Alloy Accompanied with Growth of Ni<sub>3</sub>P Nanocrystals</b>	1363
S. Tanaka, J. Takioto, S.K. Kwon, K. Shinoda and S. Suzuki	
<b>Effect of O<sub>2</sub> Partial Pressure on Magnetic Properties of Alloys CoFe-Rich Nanocrystalline Thin Films</b>	1367
L.V. Tho, K.E. Lee, C.G. Kim, C.O. Kim and W.S. Cho	
<b>Crystallization Kinetics and Texture Evolution in Iron-Based Amorphous Alloys under a Magnetic Field</b>	1371
S. Tsurekawa, H. Fujii, V.A. Yardley, T. Matsuzaki and T. Watanabe	
<b>VIII. Other Microstructure-Related Topics</b>	
	1377
<b>Crystallographic Texture Change of Pilgered Zirconium Alloy Tubes with Heat Treatment</b>	1379
Y. Choi and H. Inoue	
<b>High Temperature Deformation of a Structural Steel</b>	1383
B.M. Gonzalez, O.J. Santos, C.S.B. Castro, D.B. Santos and R. Barbosa	
<b>Recrystallization of Ferric Oxyhydroxides Consisting of FeO<sub>6</sub> Octahedral Units via Aqueous Solution</b>	1389
K. Inoue, S.K. Kwon, K. Shinoda, S. Suzuki and Y. Waseda	
<b>Effect of Initial Texture on the Deformed Microstructure of IF Steel</b>	1395
J.Y. Kang, B. Bacroix, K.H. Oh and H.C. Lee	
<b>Effects of Initial Texture on Drawing and Recrystallization Characteristics of Gold Bonding Wire</b>	1401
H.S. Kim and W.Y. Kim	
<b>On the Relationship between Pseudoelasticity and Texture Evolution in Ti-26Nb-0.5Si Alloy</b>	1407
W.Y. Kim and H.S. Kim	
<b>The Role of <math>\alpha/\gamma</math> Orientation Relationships during Ferrite Nucleation in an Fe-Cr-Ni Alloy</b>	1413
H. Landheer, S.E. Offerman, R.H. Petrov and L.A.I. Kestens	
<b>Preparation and Characteristics of Monodispersed MFe<sub>2</sub>O<sub>4</sub> Nanoparticles for Applications in Biomedicine</b>	1419
S.I. Park, J.H. Kim, C.G. Kim and C.O. Kim	
<b>Crystallographic Texture in Low Alloy TRIP Steel</b>	1423
S.J. Park, D.W. Suh, C.S. Oh and S.J. Kim	
<b>Microstructure - Texture Related Toughness Anisotropy of API-X80 Pipeline Steel Characterized by Means of 3D-EBSD Technique</b>	1429
R.H. Petrov, O.L. García, N.S. Mouríño, L.A.I. Kestens, J.H. Bae and K.B. Kang	
<b>Microstructure Evolution during Tempering of Martensite in a Medium-C Steel</b>	1435
A. di Schino, P.E. di Nunzio and G. Lopez Turconi	
<b>Texture and Microstructure Control of Al-Mg-Si Alloy Sheet by Differential Speed Rolling</b>	1443
T. Shimamura, T. Sakai, H. Utsunomiya and S. Kaneko	
<b>Effect of Crystallization on High-Temperature Plastic Flow and Ductility in Pre-Annealed Zr-Al-Ni-Cu Bulk Metallic Glass</b>	1449
Y. Takigawa, J. Kobata, H. Tsuda and K. Higashi	
<b>Distribution of the Precipitates on the Grain Boundaries in Fe-3%Si Steel during Secondary Recrystallization Annealing</b>	1453
J.R. Yim, A.R. Min, J.T. Park and Y.C. Joo	
<b>Microstructures of Microwave Heated Soda-Lime Glass - Fe Composite and Ni-Zr-Nb-Ti-Pt Metallic Glass</b>	1459
N. Yoshikawa, D.V. Louzguine-Luzgin, K. Maishiko, H.C. Wang, G.Q. Xie, M. Sato, S. Taniguchi and A. Inoue	