

7th International Conference on Recrystallization and Grain Growth 2019

Journal of Physics: Conference Series Volume 1270

Ghent, Belgium
4 - 9 August 2019

Editors:

**Leo A.I. Kestens
Hadi Pircazi**

**Tuan Nguyen Minh
Roumen H. Petrov**

ISBN: 978-1-5108-9560-7
ISSN: 1742-6588

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

This work is licensed under a Creative Commons Attribution 3.0 International Licence.
Licence details: <http://creativecommons.org/licenses/by/3.0/>.

No changes have been made to the content of these proceedings. There may be changes to pagination and minor adjustments for aesthetics.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

ELECTRICAL STEELS

QUASI IN-SITU EBSD CHARACTERIZATION OF THE EVOLUTION OF MICROTEXTURE AND MICROSTRUCTURE IN NON-ORIENTED ELECTRICAL STEELS DURING COLD ROLLING AND ANNEALING	1
<i>Y. He, M. Mehdi, M. Sanjari, E. J. Hilinski, L. A. I. Kestens, A. Edrisy</i>	
EFFECT OF FLATTENING REDUCTION RATE OF PRIMARY RECRYSTALLIZATION MICROSTRUCTURE AND RARE EARTH IN COPPER-CONTAINING GRAIN-ORIENTED SILICON STEEL ON SECONDARY RECRYSTALLIZATION.....	9
<i>Zi-li Jin, Hui-ping Ren, Zhi-nan Zhang, Zhong-wang Wu</i>	
INVESTIGATION ON THE PRIMARY AND SECONDARY RECRYSTALLIZATION TEXTURES OF RARE EARTH MICRO-ALLOYED GRAIN-ORIENTED SILICON STEEL	15
<i>Zhongwang Wu, Zili Jin, Huiping Ren, Ruixiang Liu, Tao Li, Xin Zhang</i>	
SECONDARY RECRYSTALLIZATION INDUCED BY COMPOSITE PRECIPITATES IN MAGNETOSTRICTIVE FE-GA ALLOY THIN SHEET	20
<i>Zhenghua He, Yuhui Sha, Yongkuang Gao, Songtao Chang, Fan Lei, Quan Fu, Fang Zhang, Liang Zuo</i>	
COLD ROLLING REDUCTION DEPENDENCE OF THE RECRYSTALLIZATION TEXTURE OF 3% Si NON-ORIENTED ELECTRICAL STEEL.....	26
<i>Lee Seil, C. De Cooman Burno</i>	
EFFECT OF HOT BAND ANNEALING ON TEXTURE AND GRAIN SIZE DISTRIBUTION OF PRIMARY RECRYSTALLIZATION IN GRAIN-ORIENTED SILICON STEEL.....	31
<i>K J Ko, J T Park</i>	
EVOLUTION OF RECRYSTALLIZATION TEXTURE IN NON-ORIENTED ELECTRICAL STEELS DURING FINAL ANNEALING – INFLUENCE OF SHEAR STRESS AFTER COLD ROLLING	37
<i>B Bacroix, J Schneider, A Franke</i>	
INFLUENCE OF GRAIN SIZE BEFORE COLD ROLLING ON DEVELOPMENT OF CRYSTALLOGRAPHICALLY EQUIVALENT MAIN TEXTURE COMPONENT IN RECRYSTALLIZATION TEXTURE OF 3% Si-FE	45
<i>T Immamura, Y Hayakawa</i>	
RETAINING {100} FIBRE TEXTURE IN ELECTRICAL STEEL VIA STRAIN-INDUCED BOUNDARY MIGRATION RECRYSTALLISATION.....	51
<i>M Ji, C Davis, C Slater</i>	

CHARACTERIZATION

IN-SITU OBSERVATIONS OF DISLOCATION RECOVERY AND LOW ANGLE BOUNDARY FORMATION IN DEFORMED ALUMINIUM	57
<i>H W Anes, A T J van Helvoort, K Marthinsen</i>	

NOVEL APPLICATIONS OF CENTRELESS X-RAY DIFFRACTOMETERS FOR NON-DESTRUCTIVE POLE FIGURE MEASUREMENTS	63
<i>M Seps, V Mertinger, M Benke</i>	

NON-DESTRUCTIVE TEXTURE MEASUREMENT METHODS FOR CENTRELESS X-RAY DIFFRACTOMETERS IN REVERSE MODIFIED X (CHI) MODE	69
<i>V Mertinger, M Seps, M Benke</i>	

DETERMINATION OF STATIC RECRYSTALLIZATION AND RECOVERY PARAMETERS FOR STEEL BY FITTING MODEL TO STRESS RELAXATION DATA	75
<i>A Pohjonen, O Seppälä, A Jokiranta, A Kaijalainen, M Soman, D Porter, J Larkiola, J Kömi</i>	

STEELS

ANALYSING MOBILITY FROM AUSTENITE GRAIN GROWTH DATA	81
<i>Winfried Kranendonk</i>	

EFFECT OF PEARLITE MORPHOLOGY ON RECRYSTALLIZATION BEHAVIOUR IN COLD ROLLED HIGH STRENGTH AUTOMOTIVE STEEL SHEETS	87
<i>S Janakiram, J Gautam, L A I Kestens</i>	

EFFECT OF INITIAL MICROSTRUCTURES PRIOR TO COLD-ROLLING AND INTERCRITICAL ANNEALING ON FERRITE RECRYSTALLIZATION AND FERRITE-TO-AUSTENITE PHASE TRANSFORMATION IN NB BEARING LOW-CARBON STEELS.....	95
<i>Toshio Ogawa, Hiroyuki Dannoshita, Yoshitaka Adachi, Kohsaku Ushioda</i>	

MICROSTRUCTURAL AND MICRO HARDNESS VARIATION DURING LOW TEMPERATURE RECOVERY ANNEALING IN C-MN HIGH STRENGTH STEELS.....	101
<i>S Janakiram, Jai Gautam, P Sudharshan Phani, Leo A I Kestens</i>	

THE EFFECT OF MICROALLOYING ELEMENTS ON PRIOR AUSTENITE GRAIN GROWTH OF LOW-CARBON SLAB MATERIAL.....	109
<i>J Hannula, A Kaijalainen, D Porter, J Kömi</i>	

MICROSTRUCTURE, TEXTURE, AND MECHANICAL BEHAVIOUR OF WARM-ROLLED AND ANNEALED STANDARD DUPLEX STAINLESS STEEL.....	116
<i>F L Dias, T B Tavares, D B Santos</i>	

MICROSTRUCTURAL EVOLUTION DURING CONTINUOUS ANNEALING OF A 980 MPa COLD ROLLED STEEL GRADE.....	122
<i>M V P Arruda, T M F Melo, F S Costa, D B Santos</i>	

SEVERE PLASTIC DEFORMATION

EXPERIMENTAL AND FINITE ELEMENT ANALYSIS OF CU AND NB SEVERELY DEFORMED BY 3-AXIS FORGING	128
<i>T Carnrike, N Bembridge, C Afangideh, P N Kalu</i>	

MINIATURE TENSILE TESTING OF SPD PROCESSED FINE-GRAINED ALUMINUM.....	134
<i>Harishchandra A Lanjewar, Soroosh Naghdy, Leo A I Kestens, Patricia Verleysen</i>	

PROCESSING AND APPLICATION

A STUDY OF THE STATIC RECRYSTALLIZATION BEHAVIOUR OF CAST ALLOY 825 AFTER HOT-COMPRESSES.....	140
<i>M Al-Saadi, F Sandberg, C Hulme-Smith, A Karasev, P G Jönsson</i>	
RECRYSTALLIZATION AND GRAIN GROWTH AT THE INTERFACE OF A BIMETALLIC COLAMINATED STRIP COMPOSED OF TWO DIFFERENT FE-NI ALLOYS	146
<i>J Poncelet, T Baudin, M de Oliveira, T Waeckerlé, Y Ateba-Betanda, F Brisset, AL Helbert</i>	
ON THE RECRYSTALLIZATION CHARACTERISTICS AND KINETICS OF TWO HIGH-SI DQ&P STEELS.....	152
<i>M C Somani, D A Porter, L P Karjalainen, P Kantanen, J Kömi, R D K Misra</i>	
THE ASSESSMENT OF GROWTH KINETICS IN THE INTERMETALLIC LAYERS OF AL- ALXNIY-NI LAMINATE COMPOSITES.....	158
<i>M Azimi, M R Toroghinejad, M Shamanian, L A I Kestens</i>	
SIMULATION OF DEFORMATION AND STATIC RECRYSTALLIZATION IN THE STRESS RELAXATION TEST.....	165
<i>O Seppälä, A Pohjonen, J Ilmola, A Jokiranta, A Kaijalainen, M Somani, J Larkiola</i>	
PREFERRED ORIENTATION FORMATION IN SURFACE LAYER OF ALUMINUM SHEET SUBJECTED TO FRICTION ROLL SURFACE PROCESSING AND TEMPERATURE GRADIENT ANNEALING	171
<i>Yoshimasa Takayama, Ryuichi Hamano, Takuya Arakawa, Hideo Watanabe</i>	
OBSERVATION OF GRAIN GROWTH IN U-10MO ALLOY.....	177
<i>K Kalia, W E Frazier, D P Field, V V Joshi</i>	
THE EFFECT OF NIOBIUM ON AUSTENITE EVOLUTION DURING HOT ROLLING OF ADVANCED HIGH STRENGTH STEEL	185
<i>A Smith, F Vercruyse, R Petrov, P Verleysen</i>	
EFFECT OF THERMOMECHANICAL PARAMETERS ON GRAIN GROWTH AND RECRYSTALLIZATION DURING GRAIN BOUNDARY ENGINEERING OF AUSTENITIC STAINLESS STEEL	191
<i>Shun Tokita, Hiroyuki Kokawa, Yutaka S. Sato</i>	
EFFECT OF CR AND C ON MICROSTRUCTURE EVOLUTION OF MEDIUM CARBON STEELS DURING FRICTION STIR WELDING PROCESS AND THEIR MECHANICAL PROPERTY	196
<i>C Cheng, K Kadoi, S Tokita, H Fujii, K Ushioda, H Inoue</i>	

THEORY AND SIMULATION

GRAIN ORIENTATION STABILITY AND RESIDUAL ELASTIC ENERGY INDUCED BY INTERGRANULAR ELASTIC INTERACTION IN ROLLED AL SHEET.....	202
<i>W Mao, Y Li, H Ren</i>	
EVALUATION OF THE KINETICS OF RECRYSTALLIZATION BASED ON SCALING 1D CELLULAR AUTOMATON BY DSC MEASUREMENTS	208
<i>Tamás Bubonyi, Péter barkóczy, Szilvia Gyöngyösi</i>	

COMPARISON BETWEEN EXPERIMENTAL DATA AND A CELLULAR AUTOMATA SIMULATION OF MARTENSITE FORMATION DURING COOLING	213
<i>A Kaijalainen, O Seppälä, V Javaheri, A Pohjonen, D Porter, J Kömi</i>	
LIMIT CONDITIONS FOR THE ONSET OF ABNORMAL GRAIN GROWTH IN A HOMOGENEOUS MICROSTRUCTURE: THEORY AND EXPERIMENTS	219
<i>GC Abbruzzese</i>	
 <u>TEXTURE</u>	
INFLUENCES OF COLD ROLLING, RECRYSTALLIZATION AND SURFACE EFFECT ON THE TRANSFORMATION TEXTURES IN A TA10 TITANIUM ALLOY	228
<i>P Yang, Z G Wei, X F Gu, F E Cui, W M Mao</i>	
EVOLUTION OF MICROSTRUCTURE, TEXTURE AND GRAIN BOUNDARY CHARACTER DISTRIBUTION OF POTASSIUM DOPED TUNGSTEN FIBERS ANNEALED AT VARIABLE TEMPERATURES.....	234
<i>L Tanure, D Terentyev, J Riesch, K Verbeken</i>	
 <u>NON-FERROUS</u>	
GRAIN SIZES AND DISLOCATION DENSITIES IN FCC-METALLIC MATERIALS PROCESSED BY WARM TO HOT WORKING	240
<i>V Torganchuk, A Morozova, M Tikhonova, R Kaibyshev, A Belyakov</i>	
 <u>HCP MATERIALS</u>	
STATIC RECRYSTALLIZATION OF PURE TITANIUM AFTER CRYO-DEFORMATION.....	248
<i>C K Yan, G R Cui, S J Qu, A H Feng, J Shen, D L Chen</i>	
RECRYSTALLIZATION OF CLADDING TUBES FROM ZR-BASED ALLOYS FOR NUCLEAR REACTORS	255
<i>M G Isaenkova, Yu A Perlovich, V A Fesenko, O A Krymskaya</i>	
THE EFFECT OF CONTINUOUS DEFORMATION BEHAVIORS ON TEXTURE FORMATION IN MAGNESIUM ALLOY	261
<i>D Han, K Kim</i>	
BASAL TEXTURE FORMATION BEHAVIOR OF M1 MAGNESIUM ALLOY DURING HIGH-TEMPERATURE COMPRESSION DEFORMATION	267
<i>M Park, K Kim</i>	
EFFECT OF CA CONCENTRATION ON MICROSTRUCTURE FORMATION BEHAVIORS IN AZ61 MAGNESIUM ALLOY	273
<i>K Kim, D Han, K Kim</i>	
INFLUENCE OF A PRE-DEFORMATION ON THE GROWTH OF TITANIUM MULTICRYSTALS	279
<i>D Chaubet, W Beucia, P Franciosi, B Bacroix</i>	
SIMULATIONS OF THE RELATIVE IMPORTANCE OF INITIAL SIZE ADVANTAGE AND BOUNDARY ENERGY ANISOTROPY IN ABNORMAL GRAIN GROWTH	285
<i>E J Payton, A R C Gerlt, A L Pilchak</i>	

DYNAMIC RECRYSTALLIZATION

THE OPERATIVE DYNAMIC RECRYSTALLIZATION MECHANISM OF AUSTENITE DURING THE TRANSIENT DEFORMATION IN A NI-30%FE MODEL ALLOY	291
<i>Wenxiong Chen, Chengwu Zheng, Li Dianzhong</i>	
A CONTINUOUS DYNAMIC RECRYSTALLIZATION MODEL TO DESCRIBE THE HOT DEFORMATION BEHAVIOUR OF A Ti5553 ALLOY	297
<i>R H Buzolin, F Krumphals, M Lasnik, A Krumphals, M C Poletti</i>	
CONTINUOUS DYNAMIC RECRYSTALLIZATION DURING HOT TORSION OF AN ALUMINUM ALLOY	303
<i>M C Poletti, T Simonet-Fotso, D Halici, D Canelo-Yubero, F Montheillet, D Piot, Z Kovács, N Schell, D Tolnai</i>	
THE DYNAMIC RECRYSTALLIZATION BEHAVIOR IN AL-MG ALLOYS	309
<i>Yu Borisova, A Kalinenko, D Yuzbekova, A Mogucheva</i>	

SUPERALLOYS

CONSIDERATION OF RECRYSTALLIZATION MODELING OF γ/γ' -STRENGTHENED NI-BASED SUPERALLOYS AT SUB-SOLVUS TEMPERATURES	315
<i>Takashi Nishimoto, Takuma Okajima, Qiaofu Zhang, Jiadong Gong, Greg Olson</i>	
EFFECT OF HOT DEFORMATION ON GRAIN REFINEMENT IN A RE CONTAINING NICKEL-BASED SUPERALLOY	321
<i>Sh Kh Mukhtarov, V M Imayev, A A Ganeev, R V Shakhov, A V Logunov</i>	
KINETICS OF RECRYSTALLIZATION AND GRAIN GROWTH IN AN ULTRA-FINE GRAINED COCRFENIMN-TYPE HIGH-ENTROPY ALLOY	327
<i>M V Klimova, D G Shaysultanov, R S Chernichenko, V N Sanin, S V Zhrebtssov, N D Stepanov</i>	
MICROSTRUCTURE AND TEXTURE OF A SEVERELY WARM-ROLLED AND ANNEALED ALCOCRFEI2.1 EUTECTIC HIGH ENTROPY ALLOY	333
<i>S R Reddy, U Sunkari, A Lozinko, S Guo, P P Bhattacharjee</i>	

Author Index