

Table of Contents

The Importance of Residual Stresses in Microelectronic Products and Materials W.H. Müller	1
SESSION 1A: MEASURING METHODS I	11
An X-Ray Diffraction Method to Determine Stress at Constant Penetration/Information Depth A. Kumar, U. Welzel, M. Wohlschlögel, W. Baumann and E.J. Mittemeijer	13
Mechanical Stress Gradients in Thin Films Analyzed Employing X-Ray Diffraction Measurements at Constant Penetration/Information Depths M. Wohlschlögel, W. Baumann, U. Welzel and E.J. Mittemeijer	19
Sub-Surface Residual Stress Gradients: Advances in Laboratory XRD Methods C.L. Azanza Ricardo, M. D'Incau and P. Scardi	25
Determination of Real Space Residual Stress Distributions $\sigma_{ij}(z)$ of Surface Treated Materials with Diffraction Methods Part I: Angle-Dispersive Approach T. Manns, J. Gibmeier and B. Scholtes	31
Determination of Real Space Residual Stress Distributions $\sigma_{ij}(z)$ of Surface Treated Materials with Diffraction Methods Part II: Energy Dispersive Approach I.A. Denks, M. Klaus and C. Genzel	37
SESSION 1B: MATERIAL PROCESSING I	43
The Residual Stresses Generated by Deep Rolling and their Stability in Fatigue & Application to Deep-Rolled Crankshafts H. Michaud, J.M. Sprael and F. Galzy	45
Stability of Residual Stresses of Deep Rolled Sintered Iron at Quasistatic and Cyclic Loading J. Merkel, V. Schulze, A. Wanner and O. Vöhringer	51
Residual Stress Stability in High Temperature Fatigued Mechanically Surface Treated Metallic Materials I. Altenberger, I. Nikitin, P. Juijerm and B. Scholtes	57
Residual Stresses Induced by Cross-Rolling K. Wierzbowski, S. Wroński, A. Baczanski, M. Wróbel, C. Braham, M.E. Fitzpatrick and A. Lodini	63
SESSION 1C: SIMULATION I	69
Geometry Effects when Controlling Residual Stresses in Friction Stir Welds by Mechanical Tensioning D.G. Richards, P.B. Prangnell, P.J. Withers, S.W. Williams, A. Wescott and E.C. Oliver	71
Measuring and Predicting the Effects of Residual Stresses on Crack Propagation A. Shterenlikht, D. Stefanescu, M.E. Fox, K. Taylor, J.Q. da Fonseca, A.H. Sherry and P.J. Withers	77
A Novel Closed-Form Calculation of the Stress Intensity Factor for a Crack in a Residual Stress Field J. Meng Lee Tan, M.E. Fitzpatrick and L. Edwards	83
Residual Stresses in 3D Sheet Metal Guillotining Using a Coupled Finite Elastoplastic Damage Model A. Cherouat, N. Belamri, K. Saanouni and P. Autesserre	89
Residual Stress State at Different Scales in Deep Drawn Cup of Unstable Austenitic Steel M.R. Berrahmoune, S. Berveiller, K. Inal and E. Patoor	95

SESSION 2A: MEASURING METHODS II

101

White Beam Microdiffraction Experiments for the Determination of the Local Plastic Behaviour of Polycrystals

O. Castelnau, P. Goudeau, G. Geandier, N. Tamura, J.L. Béchade, M. Bornert and D. Caldemaison

103

Inter- and Intragranular Stress Determination with Kossel Microdiffraction in a Scanning Electron Microscope

R. Pesci, K. Inal, S. Berveiller, E. Patoor, J.S. Lecomte and A. Eberhardt

109

Determinability of Complete Residual Strain Tensor from Multiple CBED Patterns

A. Morawiec

115

FibDAC - Residual Stress Determination by Combination of Focused Ion Beam Technique and Digital Image Correlation

J. Keller, A. Gollhardt, D. Vogel, E. Auerswald, N. Sabate, J. Auersperg and B. Michel

121

SESSION 2B: MATERIAL PROCESSING II

127

Residual Stress State and Fatigue Behaviour of Laser Shock Peened Titanium Alloys

I. Altenberger, Y. Sano, M.A. Cherif, I. Nikitin and B. Scholtes

129

Dynamic Analysis of Residual Stress Introduced by Laser Peening

K. Akita, M. Kuroda and P.J. Withers

135

Strengthening of Si₃N₄ Ceramics by Laser Peening

K. Akita, Y. Sano, K. Takahashi, H. Tanaka and S.I. Ohya

141

X-Ray Diffraction in Failure Analysis of Rolling Bearings

W. Nierlich, J. Gegner and M. Brückner

147

Relaxation of Residual Stresses in and around Mechanical Fasteners Due to Fatigue Loading

M.E. Fox and P.J. Withers

153

SESSION 2C: SIMULATION II

159

A Kinematic Hardening Finite Elements Model to Evaluate Residual Stresses in Shot-Peened Parts, Local Measurements by X-Ray Diffraction

C. Ould, E. Rouhaud, M. François and J.L. Chaboche

161

Thermomechanical Modelling of a Steel Plate Impacted by a Shot and Experimental Validation

S. Rouquette, E. Rouhaud, H. Pron, M. François, C. Bissieux and A. Roos

167

Material Flow Curve Influence on Macroscopic Residual Stresses in the Workpiece Bottom in High-Pressure Sheet Metal Forming

R. Krux, W. Homberg and M. Kleiner

173

Experimental and FEM Analysis of Cutting Sequence on Residual Stresses in Machined Layers of AISI 316L Steel

J.C. Outeiro, D. Umbrello and R. M'Saoubi

179

Effect of Residual Stresses on Mechanical Properties of Duplex Stainless Steel Studied by Diffraction and Self-Consistent Modelling

R. Dakhlaoui, C. Braham, A. Baczanski, S. Wroński, K. Wierzbowski and E.C. Oliver

185

POSTER SESSION I

191

The Materials Science Beamline EDDI for Energy-Dispersive Analysis of Subsurface Residual Stress Gradients

C. Genzel, I.A. Denks and M. Klaus

193

Design of Engineering Diffractometer at J-PARC

S. Harjo, A. Moriai, S. Torii, H. Suzuki, K. Suzuya, Y. Morii, M. Arai, Y. Tomota, K. Akita and Y. Akiniwa

199

E7 - New Strain Scanner at HMI - High Q-Resolution for Phase-Sensitive Analysis of Stress Distributions	
F. Henkel, U. Hermeking-Goebel, P. Lemke, T. Wilpert, C. Pietsch and R. Schneider	205
The New Materials Science Diffractometer STRESS-SPEC at FRM-II	
M. Hofmann, G.A. Seidl, J. Rebelo-Kornmeier, U. Garbe, R. Schneider, R.C. Wimpory, U. Wasmuth and U. Noster	211
SALSA: Advances in Residual Stress Measurement at ILL	
T. Pirling, G. Bruno and P.J. Withers	217
The New and Upgraded Neutron Instruments for Materials Science at HMI - Current Activities in Cooperation with Industry	
T. Poeste, R.C. Wimpory and R. Schneider	223
Review of Residual Stress Determination and Exploitation Techniques Using X-Ray Diffraction Method	
M. Belassel, J. Pineault and M.E. Brauss	229
New Type of Diffraction Elastic Constants for Stress Determination	
A. Baczanski, A. Tidu, P. Lipiński, M. Humbert and K. Wierzbowski	235
Residual Stress Reconstruction by Variational Eigenstrain Procedures	
A.M. Korsunsky, G.M. Regino and D. Nowell	241
Application of the $\cos \alpha$ Method to Area Detector Type Neutron Stress Measurement	
T. Sasaki	247
Residual Stress Distribution in Pure Bending Beam Subjected to Tensile Failure on One Side	
X.B. Wang	253
Evaluation of Uncertainties of Measurement for Residual Stresses in Coatings Determined by the Dilatometric Method	
A. Ryabchikov, H. Lille and R. Laaneots	259

SESSION 3A: MEASURING METHODS III

	265
Aspects of Residual Stress Determination Using Energy-Dispersive Synchrotron X-Ray Diffraction	
A. Steuwer, M.J. Peel and T. Buslaps	267
Micro Diffraction Imaging of Bulk Polycrystalline Materials	
T. Wroblewski, A. Bjeoumikhov and B. Hasse	273
Determination of Residual Stress Fields with High Local Resolution	
B. Hasse, M. Koçak and W. Reimers	279
Evaluation by Synchrotron Radiation of Shape Factor Effects on Residual Stress in Nitrided Layers	
V. Goret, A. Fabre, L. Barrallier and P. Vardon	285
Residual Stress Analysis Around Foreign Object Damage Using Synchrotron Diffraction	
P. Frankel, J. Ding, M. Preuss, J. Byrne and P.J. Withers	291

SESSION 3B: MATERIAL PROCESSING III

	297
Residual Stress in Laser Bent Steel Components	
M. Topic, R. Bucher, W.J.J. Vorster, S.Y. Zhang, P.J. McGrath and A.M. Korsunsky	299
The Influence of Aluminium Alloy Quench Sensitivity on the Magnitude of Heat Treatment Induced Residual Stress	
J.S. Robinson and D.A. Tanner	305
Effect of Residual Stress on High Temperature Deformation in a Weld Stainless Steel	
R.C. Wimpory, F.R. Biglari, R. Schneider, K.M. Nikbin and N.P. O'Dowd	311
Influence of Heat Treatment and Grinding Conditions on Surface Residual Stresses in the Production of Rollers	
V. Güley, A. Erman Tekkaya, T. Savaş and F. Özhan	317
Residual Stress Prediction and Relaxation in Welded Tubular Joints under Constant Cyclic Loading	
Z. Barsoum	323

SESSION 3C: SIMULATION III

329

Numerical and Experimental Analysis of Residual Stress Induced by Elastic-Plastic Bending, Tension or Torsion Loading

A. Lahlal, J.M. Sprauel and H. Michaud

331

Analysis of the Impact of a Shot at Low Velocity Using the Finite Element Method. Application to the Ultrasonic Shot-Peening Process

F. Cochenne, E. Rouhaud, D. Retraint, S. Rouquette and A. Roos

337

Residual Stress Analysis in Shot Peened and Fretting Fatigued Samples by the Eigenstrain Method

A.M. Korsunsky, K.M. Kim and G.M. Regino

343

Finite Element Simulation of the Residual Stress States after Shot Peening

M. Klemen, V. Schulze, O. Vöhringer and D. Löh

349

Residual Stresses due to High Temperature Annealing. Mathematical Model and Calculations

O.R. Hachkevych, V.S. Mykhailishyn and A. Ravska-Skotnichna

355

INVITED LECTURE

361

Influence of Residual Stress Redistribution on Fatigue Crack Growth and Damage Tolerant Design

L. Edwards

363

SESSION 4A: MEASURING METHODS IV

373

Neutron and X-Ray Diffraction Analysis of Residual Stresses in Cold-Rolled Pearlitic Steel Sheet

M. Seefeldt, A. Walentek, P. van Houtte, M. Vrána and P. Lukáš

375

Residual Stress in Railway Rails by IP/cos α Method

T. Sasaki, S. Takahashi, K. Iwafuchi, Y. Satoh, Y. Kanematsu, M. Chiba and S. Takago

381

Feasibility of Thermal Strain Measurements during Quasi-Steady State Using Neutron Diffraction

W. Woo, Z.L. Feng, X.L. Wang, K. An, W.B. Bailey, S.A. David, C.R. Hubbard and H. Choo

387

A Comparison of Strain Measurements on an Inertia Friction Weld Using the ENGIX and SALSA Neutron Strain Mapping Instruments

M. Karadge, B.M.B. Grant, G. Bruno, J.R. Santisteban, P.J. Withers and M. Preuss

393

SESSION 4B: MATERIAL PROCESSING IV

399

Residual Stresses in Welded Joints after Different Mechanical Surface Treatments

T. Nitschke-Pagel and H. Eslami-Chalandar

401

Characterisation of Residual Stresses by X-Ray Diffraction of Laser Welded AZ91 Magnesium Alloy

A. Kouadri and L. Barrallier

407

Residual Stresses in Laser Beam Welded Butt Joints of the Airframe Aluminium Alloy AA6056

P. Staron, W.V. Vaidya, M. Koçak, J. Homeyer and J. Hackius

413

Residual Stress Analysis of Laser Welded Aluminium T-Joints Using Neutron Diffraction

F.S. Bayraktar, P. Staron, M. Koçak and A. Schreyer

419

SESSION 4C: SIMULATION IV

425

Diffraction Post-Processor for Polycrystalline Plasticity Modelling

D. Dini, A.M. Korsunsky and F.P.E. Dunne

427

Numerical Simulation of Residual Stresses during the Heat Treatment of Dies Made of Hot Work Tool Steel	
C. Redl, C. Friesenbichler and V. Wieser	433
Numerical and Analytical Scale-Transition Prediction of Hygro-Mechanical Stresses in Multidirectional Carbon-Epoxy Laminates	
S. Fréour, F. Jacquemin and R. Guillén	439
Letterbox Type Repair Weld Finite Element Simulation and Residual Stress Prediction	
L.K. Keppas, D.E. Katsareas, R.C. Wimpory, N.K. Anifantis and A. Youtsos	445

SESSION 5A: MEASURING METHODS V

	451
Ultrasonic Stress Measurement in Welded Component by Using Lcr Waves: Analysis of the Microstructure Effect	
H. Qozam, J. Hoblos, G. Bourse, C. Robin, H. Walaszek, P. Bouteille and M. Cherfaoui	453
Ultrasonic Stress Measurement: Application to Preload Assessment on Already Tightened Bolts	
H. Walaszek and P. Bouteille	459
A new Approach in Residual Stresses Analysis by Speckle Interferometry	
A. Maras, G. Montay, O. Sicot, E. Rouhaud and M. François	465
Laser Photoacoustic Microscopy of Mechanical Stresses in Modern Ceramics and Metals	
K.L. Muratikov and A.L. Glazov	471

SESSION 5B: MATERIAL PROCESSING V

	477
Experimental Study of the Influence of a Trailing Heat Sink on the Welding Residual Stress Distribution	
E.M. van der Aa, M.J.M. Hermans, I.M. Richardson, N.M. van der Pers and R. Delhez	479
Development and Effects of Residual Stresses in Joints Produced by Electromagnetic Compression and its Implication on the Mechanical Properties	
P. Barreiro, V. Schulze and D. Löhe	485
Post-Weld Heat Treatment Stress Relaxation in Zircaloy 4 Plasma Welds	
J.R. Santisteban, L. Fernández, H. Corso, R.L. Martínez, L. Boccanera, L. Edwards, J.A. James and M. Turski	491
Development of Instrument for Residual Stress Measurement in a 50 mm Inner Diameter Power Generation Pipes	
M. Belassel, J. Pineault and M.E. Brauss	497

SESSION 5C: SIMULATION V

	503
Effect of Grain Size Distribution on Second Order Stresses in Plastically Deformed Polycrystals	
S. Berbenni and M. Berveiller	505
Numerical Study of the Influence of Dislocation Microstructure on Metallic Materials Mechanical Behaviour	
D. Gloaguen, J. Fajoui, B. Courant and R. Guillén	511
Numerical Simulation of Residual Stresses at the Grain and Sub-Grain Length Scale Using Atomistic Modeling	
R. Rentsch and E. Brinksmeier	517
Plastic Heterogeneities Characterisation in 16MND5 RPV Steel by X-Ray Diffraction, Comparison with Finite-Element Approach	
J.P. Mathieu, D. Bouscaud, K. Inal, S. Berveiller and O. Diard	523

SESSION 6A: MEASURING METHODS VI

	529
Measuring the Variation of Residual Stress with Depth: A Validation Exercise for Fine Incremental Hole Drilling	
A.T. Fry and J.D. Lord	531

Residual Stress Analysis in Crankshaft Using the Hole Drilling Method G. Montay, A. Cherouat and J. Lu	537
Method for Mapping Multi-Axial Residual Stresses in Continuously-Processed Bodies A.T. DeWald and M.R. Hill	543
Deep Hole Drill Residual Stress Measurement Technique Experimental Validation W.R. Mabe, W.J. Koller, A.M. Holloway and P.R. Stukenborg	549
Application of Hole-Drilling Method in Practice B. Podgornik, J. Vižintin and F. Kopač	555

SESSION 6B: MATERIAL PROCESSING VI

Measurement and Interpretation of Residual Stresses Induced in Ti-17 by Machining Conditions S. Fréour, E. Girard and R. Guillén	561
Effect of Laser Assistance Machining on Residual Stress and Fatigue Strength for a Bearing Steel (100Cr6) and a Titanium Alloy (Ti 6Al 4V) G. Germain, F. Morel, J.L. Lebrun, A. Morel and B. Huneau	563
Influence of Work Material Properties on Residual Stresses and Work Hardening Induced by Machining J.C. Outeiro and A.M. Dias	569
Residual Stress in High-Pressure Water Jet Assisted Turning of Austenitic Stainless Steel M. Habak, J.L. Lebrun, S. Waldmann, P. Robert and C. Fischer	575
Characterisation of Residual Stresses in Machined Surfaces of a High Strength Nickel-Base Superalloy W. Li, M. Preuss, P.J. Withers, D. Axinte and P. Andrews	581
	587

SESSION 6C: LAYERS I

Residual Stresses Gradient Determination in Cu Thin Films J. Peng, V. Ji, J.M. Zhang and W. Seiler	593
X-Ray Diffraction Analysis of Nonuniform Residual Stress Fields $\sigma_{ii}(\tau)$ under Difficult Conditions M. Klaus, I.A. Denks and C. Genzel	595
Residual Stress Gradients in PVD-Coated Carbide Cutting Tools B. Denkena and B. Breidenstein	601
Measurement of Residual Stresses in Thin Films by Two-Dimensional XRD B.B. He	607
Residual Stress Evolution during Decomposition of $Ti_{(1-x)}Al_{(x)}N$ Coatings Using High-Energy X-Rays M.R. Turner, P. Hedström, J. Almer, J. Ilavsky and M. Odén	613
	619

POSTER SESSION II

A Comparative Study of Microstructure and Residual Stresses of CMT-, MIG- and Laser-Hybrid Welds H. Pinto, A. Pyzalla, H. Hackl and J. Bruckner	625
Strain Scan and Texture of an Anhydrite-Dolomite Rock from the Piora-Syncline (Switzerland) C. Scheffzük, K. Walther, A. Frischbutter and R. Naumann	627
In Situ Neutron Diffraction Study on the Mechanical Behavior of an Ultra-Fine-Grained Steel K.X. Tao, H. Choo, H. Li, B. Clausen, D.W. Brown, J.E. Jin and Y.K. Lee	633
	639

SESSION 7A: MEASURING METHODS VII

	645
--	-----

Determination of Welding Residual Stresses with Help of the Micromagnetic Measurement Method	
M. Bruns and T. Nitschke-Pagel	647
Measurement of Residual Stress in an A533B Ferritic Steel Plate Containing a Repair Weld	
X. Ficquet, C.E. Truman and D.J. Smith	653
Layer Growing/Removing Method for Determination of Residual Stresses in Thin Orthotropic Inhomogeneous Discs	
J. Kôo and J. Valgur	659
Residual Strain Measurement of C/C-SiC Tubes at High Temperature	
R.C. Wimpory, C. Ohms, P. Horňák, D. Neov and A. Youtsos	665
Residual Stress Measurements in Single and Multi-Pass Groove Weld Specimens Using Neutron Diffraction and the Contour Method	
M. Kartal, M. Turski, G. Johnson, M.E. Fitzpatrick, S. Gungor, P.J. Withers and L. Edwards	671

SESSION 7B: MATERIAL PROCESSING VII

The Effect of Plastic Anisotropy on the Residual Stress within a 316L Stainless Steel Bead-on-Plate Specimen	
M. Turski, S. Pratihari, L. Edwards, M.R. Daymond and M.E. Fitzpatrick	679
Grinding-Induced Residual Shear Stresses	
B. Okolo and A. Wanner	685
Evaluation of Subsurface Distribution of Residual Stress in Austenitic Stainless Steel Using Strain Scanning Method	
T. Shobu, H. Konishi, J. Mizuki, K. Suzuki, H. Suzuki, Y. Akiniwa and K. Tanaka	691
Residual Stress Evaluation of Ni Based Weld Metal Using Neutron Diffraction Method	
S. Okido, H. Suzuki and K. Saito	697
Residual Stresses and Accuracy of Pipe Preparations by Manufacture Zirconium Tubes for the Nuclear Industry	
G. Kolmogorov, E. Kuznetsova and V. Filippov	703

SESSION 7C: LAYERS II

Stress Factors and Absolute Residual Stresses in Thin Films Determined by the Combination of Curvature and $\sin^2\psi$ Methods	
K.J. Martinschitz, E. Eiper and J. Keckes	711
Effect of Surface Nano Crystallization on Tribological Properties of Stainless Steel	
T. Roland, D. Retraint, K. Lu and J. Lu	717
Stresses Analysis on Coarse Grain Zn Film during Tensile Loading	
W.J. Huang, V. Ji and W. Seiler	723
Scratch Test of TiCN Thin Films with Different Preferred Orientation	
H. Goto, M. Gotoh, S. Ejiri, Y. Horimoto and Y. Hirose	729
Strains, Stresses and Elastic Properties in Polycrystalline Metallic Thin Films: In Situ Deformation Combined with X-Ray Diffraction and Simulation Experiments	
P. Goudeau, D. Faurie, B. Girault, P.O. Renault, E. Le Bourhis, P. Villain, F. Badawi, O. Castelnau, R. Brenner, J.L. Béchade, G. Geandier and N. Tamura	735

SESSION 8A: MEASURING METHODS VIII

Oxford HEXameter: Laboratory High Energy X-Ray Diffractometer for Bulk Residual Stress Analysis	
A.M. Korsunsky, S.Y. Zhang, D. Dini, W.J.J. Vorster and J. Liu	743
A New Type of X-Ray Diffractometer with Cooperating Robots for Residual Stress Analysis on Large Components	
R. Hessert, W. Satzger, A. Haase and A. Schafmeister	749
Effect of Detector Width and Peak Location Technique on Residual Stress Determination in Case of Work-Hardened Materials	
M. Belassel, E. Bocher and J. Pineault	755

Specific Corrections Associated to Linear CCD Detectors Used in X-Ray Diffraction C. Ferreira, M. François and R. Guillén	761
SESSION 8B: MULTIPHASE MATERIALS	767
Internal Stress Development during Fatigue Cycling of High-Strength Al/SiC Metal Matrix Composites M.E. Fitzpatrick	769
Effective Stresses and Plastic Strain Rates in a Superalloy: a High Temperature In Situ Study by Synchrotron X-Ray TCD A. Jacques, O. Ferry, F. Diologent, P. Caron and P. Bastie	775
Varistor Ceramic: Residual Strain and Texture Analysis by Neutron Time-of-Flight Diffraction C. Scheffzük, P. Kluge-Weiss and F. Greuter	781
Residual Stresses in Sintered Diamond-Cobalt Composites H.A. Crostack, U. Selvadurai-Lassl, W. Tillmann, M. Gathen, C. Kronholz, T. Wroblewski and A. Rothkirch	787
SESSION 8C: LAYERS III	793
Data Collection Requirements for the Analysis of Residual Stress in Polycrystalline Coatings A.C. Vermeulen and D. Götz	795
Interdiffusion and Stress Development in Thin Film Diffusion Couples Y. Kuru, J. Chakraborty, U. Welzel, M. Wohlschlägel and E.J. Mittemeijer	801
Evaluation of Deformation Behavior in Cu Thin Film under Tensile and Fatigue Loading by X-Ray Method Y. Akiniwa, T. Suzuki and K. Tanaka	807
Dependence Between Aging Treatments and Residual Stresses on Composite Laminate O. Sicot, X.L. Gong, X.J. Gong, A. Cherouat and J. Lu	813
SESSION 9A: PHASE TRANSFORMATION I	819
Evolution of Residual Strains in Metastable Austenitic Stainless Steels and the Accompanying Strain Induced Martensitic Transformation P. Hedström, J. Almer, U. Lienert and M. Odén	821
The Effect of Phase Transformations on Predicted Values of Residual Stresses in Welded Ferritic Components A.P. Warren, S.K. Bate, R. Charles and C.T. Watson	827
Residual and Internal Stress States in Duplex Steel with TWIP Effect M.N. Shiekhelsouk, V. Favier, K. Inal, S. Allain, O. Bouaziz and M. Cherkaoui	833
SESSION 9B: MICRO AND INTERGRANULAR STRESSES I	839
Quantitative Estimation of the Second Order Plastic Incompatibility Stresses in Textured Duplex Steel S. Wroński, A. Baczmański, K. Wierzbowski, C. Braham, R. Dakhlaoui and E.C. Oliver	841
In Situ X-Ray Diffraction Study of Load Partitioning and Microyielding for the Super Duplex Stainless Steel SAF2507 (UNS S32750) R.L. Peng, J. Gibmeier, S. Eulert, S. Johansson and G.C. Chai	847
Development of Intergranular Stresses in Zirconium Alloy Cladding Tubes: Experimental and Numerical Studies D. Gloaguen, E. Girard and R. Guillén	853
Second Order Stresses Distribution in Textured Copper N. Hfaiedh, M. François and K. Saanouni	859

SESSION 9C: LAYERS IV

865

Residual Stress Evaluation in TiN Coatings Used for Erosion Protection of Aerospace Components

M. Bielawski

867

Measurement of Residual Stresses in Electrochemically Metallized Coatings on Thin Cross-Cut Ring Substrate

H. Lille, J. K  o, A. Ryabchikov and T. Pihl

873

Residual Stress in EB-PVD Thermal Barrier Coatings

K. Suzuki, K. Tanaka and T. Shobu

879

Comparative Studies of Textured Pulsed Laser Deposition and Sol-Gel Growth of Thin Hydroxyapatite Layers on Titanium Substrates

A. Carrad  , A. Fabre, L. Barrallier, N. Viart, I.N. Mihailescu, G. Socol, S. Grigorescu, J. Werckmann, S. Ciuca and M. Tarcolea

885

SESSION 10A: PHASE TRANSFORMATION II

891

Intergranular Strain and Phase Transformation in a Cobalt-Based Superalloy

M.L. Benson, A.D. Stoica, P.K. Liaw, H. Choo, T.A. Saleh, X.L. Wang, D.W. Brown and D.L. Klarstrom

893

Fatigue Degradation and Martensitic Transformation of Austenitic Stainless Steel AISi 321: New Results and Prospects

Y.V. Taran, J. Schreiber, M.R. Daymond and E.C. Oliver

899

Stress Determination during the Mechanically-Induced Martensite Phase Transformation in the Superelastic Alloy CuAlBe by Neutron Diffraction

B. Malard, T. Pirling, K. Inal, E. Patoor and S. Berveiller

905

Residual Stress and Microstructure in the Rail/Wheel Contact Zone of a Worn Railway Wheel

E. Wild and W. Reimers

911

On the Development of Grain-Orientation-Dependent and Inter-Phase Stresses in a Super Duplex Stainless Steel under Uniaxial Loading

R.L. Peng, Y.D. Wang, G.C. Chai, N. Jia, S. Johansson and G. Wang

917

SESSION 10B: MICRO AND INTERGRANULAR STRESSES II

923

Evolution of Microstrains at Cyclic Incremental Deformation of Steel 42CrMo4

L.W. Meyer, C. Kuprin, G. Fritsche and F. Hahn

925

In Situ X-Ray Stress Analysis for the Highly Textured Mg-Base Wrought Alloy AZ31

J. Gibmeier, M. G  tting, W. Zinn and B. Scholtes

931

Formation and Interpretation of Micro Residual Stresses in Cold Deformed Brass Alloys

B. Reetz and W. Reimers

937

X-Ray Stress Estimation of Carbide in Spheroidized JIS SK5 Steel

L. Che, M. Gotoh, Y. Horimoto and Y. Hirose

943

SESSION 10C: LAYERS V

949

Mechanical Properties of Hydroxyapatite in Bone at the Interface with Implants

A. Benmarouane, T. Hansen, P. Millet and A. Lodini

951

The Measurement of Stresses within Oxides Produced on Austenitic and Ferritic Steels Using Raman Spectroscopy

G. Hilson, K.R. Hallam and P.E.J. Flewitt

957

Dependence of Oxidation Behavior and Residual Stresses in Oxide Layers on Armco Iron Substrate Surface Condition

C. Juricic, H. Pinto, T. Wroblewski and A. Pyzalla

963

Residual Stress Analysis in Reed Pipe Brass Tongues of Historic Organs

A. Manescu, A. Giuliani, F. Fiori and B. Baretzky

969

