5TH EUROPEAN SYMPOSIUM ON SUPERALLOYS AND THEIR APPLICATIONS 2026

Program overview

SUNDAY 3RD MAY

15H30 – 18H30

REGISTRATION

18H30 – 20H30

GET TOGETHER
COCKTAIL & DINNER

20H30 – 21H30

Keynote lecture
M. Hardy
Plenary room

MONDAY 4TH MAY

08H30 – 10H10

Blade Processing
Plenary room

COFFEE BREAK

10H40 – 12H20

Additive Manufacturing
Plenary room

LUNCH

14H – 16H

Disk Processing
Plenary room

COFFEE BREAK

16H30 – 17H50

Repair, Refurbishment, Recycling
Plenary room

18H – 20H

Poster Session
Room 1
Room 2

DINNER

TUESDAY 5TH MAY

08H30 – 10H10

Disk Alloys Mechanical Behavior
Plenary room

COFFEE BREAK

10H40 – 12H20

Environmental Resistance
Plenary room

LUNCH

14H30 – 18H30

FREE AFTERNOON

19H-21H30

BANQUET

WEDNESDAY 6TH MAY

08H30 – 10H10

Blade Alloys Mechanical Behavior
Plenary room

COFFEE BREAK

10H40 – 12H20

Superalloys for Power Generation
Plenary room

LUNCH

14H – 15H40

Advanced Characterizations
Plenary room

COFFEE BREAK

16H10 – 18H

New-grades Superalloys
Plenary room

18H – 20H

Poster Session
Room 1
Room 2

DINNER

THURSDAY 7TH MAY

08H30 – 10H10

ICME - Digital Twins for Materials and Processes
Plenary room

COFFEE BREAK

10H40 – 11H40

Keynote lecture
T. Pollock
Plenary room

11H40 – 12H40

Plenary room
AWARDS CEREMONY & CLOSURE

LUNCH

14H DEPARTURE

Taking photos of slides during presentations or of posters is strictly prohibited unless express consent is given by the presenter

SUNDAY 3RD MAY

20H30 - 21H30

Keynote lecture - Mark HARDY

Design & Manufacturing Challenges for Disc Rotors in Aircraft Engines

Plenary room

High bypass ratio turbofan aircraft engines and cycles are continuously evolving to provide improved efficiencies for reducing fuel consumption and emissions. However, whilst propulsive and aerodynamic optimisations of aircraft engines are possible, the increased demands upon nickel based superalloys, which are used in the hot section parts, limit the thermal efficiency improvements that can be achieved. The requirements for reduced engine core sizes and increased temperatures and stresses pose a complex set of seemingly conflicting property requirements for the materials considered for safety-critical disc rotor applications. The apparent conflict is in the design priority between strength and damage tolerance or crack growth resistance.

The former determines the size and weight of the disc, whereas the latter is critical for achieving shop visit intervals or probabilistic lives.

The lecture will begin with requirements, then review material and component manufacture, before discussing the effects of microstructure, manufacturing anomalies, surface modifications and operating environment on behaviour. In all these aspects, it is critical that material deformation and damage is understood from the extensive use of material models, process simulations, advanced material characterisation techniques, finite element methods and micromechanics, in addition to fundamental physical metallurgy and testing, whether on laboratory test pieces or on finished components.

Mark HARDY, Rolls-Royce plc, Derby, UK
with many authors from Rolls-Royce plc, ATI Materials, University of Arizona, University of Birmingham, University of Cambridge, Cranfield University, Imperial College London, University of Nottingham & Swansea University

Monday 4th may program

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DINNER

MONDAY 4TH MAY

Blade Processing

08H30 - 10H10

Dendritic Segregation and Homogenization of Elements in Re-containing Alloys with Wide Variation of Dendrite Arm Spacing

presented by **Akane SUZUKI** [1]
Chen SHEN [1]
David WARK [2],
Scott OPPENHEIMER [1]
Douglas KONITZER [3]
[1] *GE Aerospace Research, USA*
[2] *GE Research,USA*
[3] *GE Aerospace, USA*

Evolution of Dendritic Patterns during Direction Solidification of Ni-base Alloys

presented by **Hongbiao DONG**
School of Engineering, UK

A Permeability Based Model for Prediction of Freckling in Nickel Superalloy Single Crystal Castings

presented by **Nick GREEN**
Dmytro SHEVCHENKO
High Temperature Research Centre, UK

Toward a Better Understanding of Recrystallisation Mechanisms of Single Crystal Nickel Based Superalloys during Turbine Blades Processing

presented by **Louise GRAU** [1,2]
Florent MAUGET [1]
Patrick VILLECHAISE [1]
Besnik SADRIJI [2]
Jonathan CORMIER [1]
[1] *Institut Pprime, France*
[2] *Safran Aircraft Engines, France*

Uncovering the Mechanism of Recrystallisation in a Single Crystal Superalloy: The Role of Porosity and Localised Strain in Nucleation

presented by **Anh H. PHAM** [1]
Mitsuaki TAKEMOTO [1], Kei KODERA [1], Satoshi UTADA [2], Yuanbo T. TANG [3], Hideki WAKABAYASHI [1], Shigekazu MORITO [1], D Graham MCCARTNEY [4], Catherine M. RAE [5], Roger C. REED [4]
[1] *Shimane University, Japan*
[2] *National Institute for Materials Science, Japan*
[3] *University of Birmingham, UK*
[4] *University of Oxford, UK*
[5] *University of Cambridge, UK*

MONDAY 4TH MAY

Additive Manufacturing

10H40 – 12H20

Characterisation of Y' Precipitation Kinetics in Additively Manufactured Ni-Based Superalloy ABD-900AM

presented by **Yuhan ZHUGE** [1]
Yuanbo. T. TANG [3]
Sergio LOZANO-PEREZ [1]
Roger. C. REED [1,2]
[1] *Department of Materials, UK*
[2] *Department of Engineering Science, UK*
[3] *School of Metallurgy & Materials, UK*

Rapid Discovery of High-Performance Additive Manufactured Superalloys using High-Throughput and Artificial Intelligent Methods

presented by **Pei LIU** [1]
Guangbao SUN [1],Teng AN [1]
Hailong QIN [2], Hongyao YU [2]
Zhongnan BI [1]
[1] *Research Institute of Advanced Materials (Shenzhen) Co., China*
[2] *Beijing GAONA Materials & Technology Co., China*

Recrystallisation Behaviour during Post-Processing of an Additive Manufactured Nickel based Superalloy

presented by **Kameshwaran SWAMINATHAN**
Joel ANDERSSON
University West, Sweden

Improving the High-Temperature Mechanical Properties of L-PBF CM247LC through HIPing and Ageing Treatments

presented by **Suyalatu SUYALATU** [1]
Kazuto ARAKAWA [2], Hideki WAKABAYASHI[2], Shohei UEKI [2], Norio HIGUCHI[1], Hitoshi SAKAI [1], Yugo HIGASHIDA [3], D. Graham McCARTNEY [2,4], Catherine RAE [2,5], Roger C. REED [2, 4]
[1] *NTT Data XAM Technologies Corporation, Japan*
[2] *NEXTA Centre, Shimane University, Japan*
[3] *Kiguchi Technics Inc.,Japan*
[4] *Department of Materials, UK*
[5] *Department of Materials Science and Metallurgy, UK*

From Alloy Design to Printing: AI Accelerates the Development of Nickel-Based Superalloys

presented by **Jian YAO**
Junkang WU, Jie SU, Liming TAN, Lan HUANG, Feng LIU
Powder Metallurgy Research Institute, Central South University, China

MONDAY 4TH MAY

Disk Processing

14H - 16H

An Innovative Experimental Thermomechanical Simulator of Ring Rolling Process on Screw Press.

presented by **Yann JANSEN** [1]
Florian BARATTO [2], Christian DUMONT [3], Regis BIGOT [4], Laurent LANGLOIS [4]
[1] *Aubert & Duval, France*
[2] *AM VALOR, France*
[3] *Aubert & Duval, France*
[4] *ENSAM de Metz, France*

On the Impact of Dwell Time on Recrystallization During Incremental Deformation.

presented by **Théo HUYGHE** [1,2]
Malik DURAND [1], Daniel PINO MUNOZ [1], Christian DUMONT [3], Eric GEORGES [3], Julien DE JAEGER [2], Marc BERNACKI [1], Nathalie BOZZOLO [2]
[1] *Centre for Material Forming (CEMEF) - Mines Paris PSL University, France.*
[2] *SafranTech – Safran SA, France.*
[3] *Aubert & Duval, Technical Division, France*

Effect of γ'-Supersolvus Solutioning Heat Treatment Parameters on the Grain Structure Evolution of Powder Metallurgy Nickel Base γ-γ' Superalloys

Presented by **Corentin STRADY** [1]
Alexis NICOLAY [2], Nathalie BOZZOLO [3], Andrea AGNOLI [1], Julien DE JAEGER [3], Marc BERNACKI [2]
[1] *Safran Aircraft Engines, France*
[2] *CEMEF Mines Paris / PSL Research University, France*
[3] *SafranTech, France*

Precipitation Sequence and Kinetics in the Inconel 706 Superalloy under Isothermal Conditions using in situ Electrical Resistivity

Presented by **Moukrane DEHMAS** [2]
Laurane FINET [1], Raphaël PERSEE [1,2], Ronan MAINGUY [2]
[1] *Aubert & Duval, Technical Division, B1, France*
[2] *CIRIMAT, Université de Toulouse, CNRS, France*

Influence of Heat Treatment Variables on the Evolution of the Precipitate Population in VDM Alloy 780

Presented by **Fernando PASCUAL GOCE** [1], Masood HAFEZ HAGHIGHAT [2], Bodo GEHRMANN [2], Marc BERNACKI [1], Baptiste FLIPON [1], Madeleine BIGNON [1]
[1] *Centre de Mise en Forme des Matériaux (CEMEF), Mines Paris – PSL University, France*
[2] *VDM Metals International GmbH, Germany*

MONDAY 4TH MAY

Repair, Refurbishment, Recycling

16H30 – 17H50

Exploring Oxides for Removing Impurity Si in Ni-base Superalloys During Vacuum Induction Melting Process

Presented by **Masaki DOBASHI** [1,2]
Shizuna OYANO [1,2], Naoki OHNO [1,2], Chihiro TABATA [1,2], Yuji TAKATA [2], Satoshi UTADA [2], Toshio OSADA [2], Kyoko KAWAGISHI [1,2], Shinsuke SUZUKI [1]
[1] *Waseda University, Japan*
[2] *National Institute for Materials Science (NIMS), Japan*

Creep and Tensile Properties of Waspaloy produced by Wire Arc Additive Manufacturing

Presented by **Marjolaine SAZERAT** [1]
Alice CERVELLON [2], Sophie GILLET [2], Samuel HEMERY [3], Azdine NAIT-ALI [3], Patrick VILLECHAISE [3], Roland FORTUNIER [4], Jonathan CORMIER [3]
[1] *Safran Additive Manufacturing Campus, Materials & Processes Department, France*
[2] *Safran Aircraft Engines, Engineering Department, Processes Methods Team, France*
[3] *Institut Pprime, Physics and Mechanics of Materials Department, ISAE-ENSMA, France*
[4] *LTDS, Centrale Lyon – ENTPE – ENISE, France*

Cyclic Recovery Heat Treatment to Control Recrystallization of a Single-Crystal Superalloy CMSX-4

Presented by **Guang XIE** [2] **& Jian ZHANG** [2]
Ningfeng HE [1,2], YuZhang Lu [2], Jian SHEN [2], YaWei LI [2]
[1] *School of Materials Science and Engineering, University of Science and Technology of China, China*
[2] *Institute of Metal Research, Chinese Academy of Sciences, China*

Rejuvenation of a Crept Second-generation Nickel-Based Single Crystal Superalloy with Emphasis on Heterogeneity of Dendritic Structures

Presented by **Jiaxi LIU**
Longfei LI, Weiwei ZHENG, Qiang FENG
State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, China

FOLLOWING TALK ON NEXT PAGE

MONDAY 4TH MAY

Repair, Refurbishment, Recycling

16H30 – 17H50

Exploring the Microstructure, Stability and Oxidation Resistance of Alloy 625+WC Nanocomposites for Repair Welding Applications of Cast Ni-based Superalloys

Presented by **Łukasz RAKOCZY** [1]
Małgorzata GRUDZIEŃ-RAKOCZY [2], Grzegorz CEMPURA [1], Tomasz KARGUL [1], Tomasz DUDZIAK [2], Ewa RZĄD [2], Marcin MADEJ [1], Dawid KOZIEŃ [3], Rafał CYGAN [4], Dušan GALUSEK [5]

[1] *AGH University of Kraków, Faculty of Metals Engineering and Industrial Computer Science, Poland*
[2] *Łukasiewicz Research Network-Kraków Institute of Technology, Poland*
[3] *AGH University of Krakow, Faculty of Materials Science and Ceramics, Poland*
[4] *Consolidated Precision Products, Poland*
[5] *FunGlass, A. Dubček University of Trenčín, Slovakia*

Poster Session

18H – 20H

Tuesday 5th may program

08H30 - 10H10
Disk Alloys Mechanical Behavior
Plenary room

COFFEE BREAK

10H40 – 12H20
Environmental Resistance
Plenary room

LUNCH

14H – 18H30

FREE AFTERNOON

19H-21H30

BANQUET

TUESDAY
5TH MAY

Disk Alloys Mechanical Behavior

8H30 – 10H10

Creep Strength Dependence of a γ/γ' Ni-based Superalloy to the Prior Thermomechanical Processing Route

Presented by **Matilde LECOURT** [1, 2]
Florence HAMON [1], Florent MAUGET [1], Alexandre EL SABBAGH [2], Nicolas CHANFREAU [2], Michel SABY [2], Anne JOULAIN [1], Jonathan CORMIER [1]
[1] *Institut Pprime, Université de Poitiers, ISAE-ENSMA, CNRS, France*
[2] *Aubert et Duval, France*

Mechanical Properties of the Polycrystalline γ/γ' Nickel-Based Superalloy René 65 during Long-term Aging

Presented by **Julien PROUTEAU** [1]
Patrick VILLECHAISE [1], Anchal GOYAL [2], Jonathan CORMIER [1]
[1] *Institut Pprime, UPR CNRS n°3346, CNRS – Université de Poitiers – ISAE-ENSMA, Physics and Mechanics of Materials Department, ISAE-ENSMA, France*
[2] *Safran Aircraft Engines, France*

Development of a Grain Boundary γ' forming Heat Treatment to improve Dwell Fatigue

Presented by **Annie M. L. ANDERSSON** [1]
George J. WISE [1], Hangyue LI [2], Mark C. HARDY [3], Howard J. STONE [1]
[1] *Department of Materials Science & Metallurgy, University of Cambridge, UK*
[2] *School of Metallurgy and Materials, University of Birmingham, UK*
[3] *Rolls-Royce plc, UK*

Characterising the Effect of Environment and Salt Concentration on the Fatigue Life of a Nickel Disc Alloy

Presented by **Mark HARDY** [1]
Yong LI [2], Simon GRAY [3], Catherine JACKSON [1], Hollie COCKINGS [4], Mary TAYLOR [5], Benedict GRANT [1]
[1] *Rolls-Royce plc, UK*
[2] *Swansea University, UK*
[3] *Cranfield University, UK*
[4] *Fraser-Nash Consultancy, UK*
[5] *University of Birmingham , UK*

Ductility Dependence of a Ni-based Superalloy made by Spark Plasma Sintering to PPBs and Grain Size

Presented by **Rémi LEBOT** [1,2]
Emmanuel SALY [1,2,3], Gautier HUSER [2], Pierre SALLOT [2], Patrick VILLECHAISE [1], Jonathan CORMIER [1]
[1] *Institut PPrime/ ISAE-ENSMA, France*
[2] *SAFRAN Tech, France*
[3] *SAFRAN Power Units, France*

TUESDAY 5TH MAY

Environmental Resistance

10H40 – 12H20

Effect of W and Mo on the Hot Corrosion Behaviour by Na_2SO_4 Deposits of Ni-Based Superalloys Between 850 and 1000 °C in Air

presented by **Damien PIEL** [1]
Mathieu MONDET [2], Sandrine CHARLES [3], Vladislav KOLARIK [4], Fernando PEDRAZA [1]
[1] *Université de La Rochelle. LaSIE UMR 7356-CNRS, France.*
[2] *Safran Aircraft Engines, Site de Châtellerault, France.*
[3] *Safran Aircraft Engines, Site de Gennevilliers, France.*
[4] *Fraunhofer-Institut für Chemische Technologie, Germany.*

Effect of Mn and Si on Corrosion of Ni-based Superalloys for Turbine Disc Application

presented by **Cynthia RODENKIRCHEN** [1]
Victoria MINNS [2], Adriana ENCINAS-OROPESA [2], John NICHOLLS [2], Mark HARDY [3], Stella PEDRAZZINI [1]
[1] *Imperial College London, UK*
[2] *Cranfield University, UK*
[3] *Rolls-Royce plc., UK*

Fracture Characteristics of a Hydrogen charged Nickel-based Superalloy 718 at Cryogenic Temperatures

presented by **Marina LUKAS** [1]
Nina DAMM [1], Jan PLATL [2], Andreas DREXLER [2], Matthias EICHINGER [3], Magdalena ESKINJA [3], Gregor MORI [3], Zoltan SIMON [4], Michael SCHEERER [4], Stefan MARSONER [1], Vsevolod RAZUMOVSKIY [1]
[1] *Materials Center Leoben Forschung GmbH, Austria*
[2] *voestalpine BÖHLER Edelstahl GmbH & Co KG, Austria*
[3] *Chair of General and Analytical Chemistry, Austria*
[4] *Aerospace & Advanced Composites GmbH, Austria*

FOLLOWING TALKS
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TUESDAY 5TH MAY

Environmental Resistance

10H40 - 12H20

Hot Corrosion Behavior of a New Nickel-Based Superalloy TROPEA

presented by **Louis HUNAULT** [1]
Fernando PEDRAZA [1], Stéphane MATHIEU [2], Lionel ARANDA [2], Jonathan CORMIER [3], Joseph LAUTRU [4], Renaud PODOR [4]
[1] *LaSIE 7356-CNRS / Université de La Rochelle, France*
[2] *Institut Jean Lamour / Université de Lorraine, France*
[3] *Institut Pprime / ISAE-ENSMA, France*
[4] *ICSM, Univ Montpellier, CNRS, CEA, ENSCM, Site de Marcoule, France*

Investigation of the Hydrogen Embrittlement Impact of the Intermetallic Precipitation Phases β and γ' in the CoNiCr-based Superalloy CoWAlloy6

presented by **Oliver NAGEL** [1]
Lucas STROBEL [1], Ralph GILLES [2], Steffen NEUMEIER [1]
[1] *Department of Materials Science and Engineering, Friedrich-Alexander-Universität Erlangen-Nürnberg, Institute I: General Materials Properties, Germany*
[2] *Heinz Maier-Leibnitz Zentrum, Technical University, Germany*

Wednesday 6th may program

08H30 - 10H10
Blade Alloys Mechanical Behavior
Plenary room

COFFEE BREAK

10H40 - 12H20
Superalloys for Power Generation
Plenary room

LUNCH

14H - 15H40
Advanced Characterizations
Plenary room

COFFEE BREAK

16H10 - 18H
New-grades Superalloys
Plenary room

18H - 20H
Poster Session
Room 1
Room 2

DINNER

WEDNESDAY 6TH MAY

Blade Alloys Mechanical Behavior

08H30 - 10H10

Miniature Mechanical Testing to Infer Damage from Accidental and Complex Thermal-Mechanical Exposure for Single Crystal Superalloys

presented by **Yuanbo T. TANG** [1,2]
Caspar SCHWALBE [3], Julia BRUNTHALER [3], Roger C. REED [2], Satoshi UTADA [2,4]

[1] *School of Metallurgy, University of Birmingham, UK*
[2] *Department of Materials, University of Oxford, UK*
[3] *MTU Aero Engines AG, Germany*
[4] *Research Center for Structural Materials, National Institute for Materials Science, Japan*

Strain Rate and Temperature Dependent Deformation Mechanisms in the Single Crystal Superalloy CMSX-4: Insights from Full-Field Surface Mapping

presented by **Melvin Z. MIQUEL** [1]
Satoshi UTADA [1,2], Yuanbo T. TANG [1,3], Roger C. REED [1,4]

[1] *Department of Materials, University of Oxford, Parks Road, UK*
[2] *National Institute for Materials Science, Japan*
[3] *School of Metallurgy and Materials, University of Birmingham, UK*
[4] *Department of Engineering Science, University of Oxford, UK*

Challenging the Limit of Strengthening by γ/γ' Lattice Misfit on the High Temperature Creep Properties of Ni-base Single Crystal Superalloy

presented by **Satoshi UTADA**
Tadaharu YOKOKAWA, Toshiharu KOBAYASHI, Kyoko KAWAGISHI, Michinari YUYAMA, Hiroshi HARADA, Toshio OSADA
Research Center for Structural Materials, National Institute for Materials Science, Japan

Segregation to Creep-induced Planar Faults in Ni-base Single Crystal Superalloys

presented by **Zhongmin LONG** [1], **Yolita M. EGGELER** [1], **K. V. VAMSI** [4], Christian DOLLE [1], Lukas GRÜNEWALD [1], David BÜRGER [2], Yuting DAI [3], Christian KÜBEL [3], Vamshi Krishna RAO [4]

[1] *Laboratory for Electron Microscopy, Karlsruhe Institute of Technology, Germany*
[2] *Institute for Materials, Ruhr-Universität Bochum, Germany*
[3] *Institute of Nanotechnology, Karlsruhe Institute of Technology, Germany*
[4] *Metallurgical Engineering and Materials Science, Indian Institute of Technology Indore, India.*

Influence of the Chemical Composition and of the Misfit on the Tensile Behavior of Different Generation Ni-based Single Crystal Superalloys

presented by **Florence PETTINARI-STURMEL** [1]
Benoit MANSOZ [1,4], Jakob BANDORF [2], Steffen NEUMEIER [2], Pierre CARON [3], Jonathan CORMIER [4],

[1] *CEMES CNRS / University of Toulouse, France*
[2] *High-Temperature Materials Group/ Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
[3] *Retired from ONERA*
[4] *Institut Pprime - Physics and Mechanics of Materials Department/ ISAE ENSMA, France*

WEDNESDAY 6TH MAY

Superalloys for Power Generation

10H40 - 12H20

Long-term Stability and Resulting Viscoplastic Behavior of Inconel 625 at 700 °C

presented by **Fabio MACHADO ALVES DA FONSECA** [1]
Jérémy RAME [1], Camille ROUSSEAU [1], Guillaume BURLOT [2], Jonathan CORMIER [2]
[1] *NAAREA, Nanterre, France*
[2] *Institut Pprime, UPR CNRS no. 3346, Physics and Mechanics of Materials Department, CNRS – Université de Poitiers – ISAE-ENSMA, France*

On the optimization of wrought superalloys by small variations in Ti and Al content

presented by **Tim STORCH** [1]
Julian HUNFELD [1], Yujiao LI [2], Jürgen KIESE [3], Hongcai WANG [1], Jean-Marc JOUBERT [4], Marie MÜNCHHALFEN [5], Jürgen SCHREUER [5], Gunther EGGELER [1], Guillaume LAPLANCHE [1]
[1] *Institute for Materials / Ruhr-University Bochum, Germany*
[2] *Center for interface-dominated high-performance materials (ZGH) / Ruhr-University Bochum, Germany*
[3] *VDM Metals International GmbH, Germany*
[4] *Institut de Chimie et des Matériaux Paris-Est (UMR7182), CNRS, UPEC, France*
[5] *Institute of Geology, Mineralogy and Geophysics / Ruhr-University Bochum, Germany*

Microstructural Evolution and Strength of 3D Printed and Directly Aged ODS-strengthened Inconel 718

presented by **Andreas BEZOLD** [1]
Subham CHATTORAJ [1], Kojo BENEFO [1], Calvin M. STEWART [1], Timothy M. SMITH [2], Michael J. MILLS [1]
[1] *The Ohio State University, USA*
[2] *NASA Glenn Research Center, USA*

Deformation Twinning and Dislocation Motion During Creep Near the Solvus Temperature of the γ''' Phase

presented by **Victoria TUCKER** [1]
Thomas MANN [2], Michael TITUS [1]
[1] *Purdue University, West Lafayette, USA*
[2] *Haynes International, Kokomo, USA*

Novel Al/Ti-Modified Ni-Mo-W-Cr Superalloys for High Temperature Structural Applications

presented by **Vijay K. VASUDEVAN** [1]
N. Naveen KUMAR [1], Sonali RAVIKUMAR [1], Boateng T. DONKOR [2], Vishal SONI [1], Jie SONG [3], Gopal B. VISWANATHAN [4], Matthew A. STEINER [2], Steven J. ZINKLE [5], V. A. RAVI [6], G. MURALIDHARAN [7]
[1] *University of North Texas, Department of Materials Science and Engineering, USA*
[2] *University of Cincinnati, Department of Mechanical and Materials Engineering, USA*
[3] *Virginia Polytechnic Institute and State University, Department of Aerospace and Ocean Engr, USA*
[4] *Ohio State University, Department of Materials Science and Engineering and CEMAS, USA*
[5] *University of Tennessee, Department of Nuclear Engineering and Materials Science and Engineering, USA*
[6] *California State Polytechnic University, Department of Chemical and Materials Engineering, USA*
[7] *Oak Ridge National Laboratory, Department of Materials Science and Engineering and CEMAS, USA*

WEDNESDAY 6TH MAY

Advanced Characterizations

14H-15H40

In Situ Characterisation of the Thermomechanical Deformation Behaviour of Powder-Processed Based Superalloys

presented by **Katerina A. CHRISTOFIDOU** [1]
Frances E. SYNNOTT [1], Lewis R. OWEN [1], Howard J. STONE [2], Nicholas G. JONES [2], Paul M. MIGNANELLI [3], Mark C. HARDY [3]
[1] *Department of Materials Science and Engineering, The University of Sheffield, UK*
[2] *Department of Materials Science and Metallurgy, The University of Cambridge, UK*
[3] *Rolls-Royce plc., UK*

A New High-Resolution Analysis Method for Inclined Stacking Faults in the TEM

presented by **Erdmann SPIECKER** [1]
Nicolas KARPSTEIN [1], Lukas MÜLLER [1], Andreas BEZOLD [2], Steffen NEUMEIER [2]
[1] *Friedrich-Alexander-Universität Erlangen-Nürnberg, Department of Materials Science & Engineering, Institute of Micro- and Nanostructure Research, and Center for Nanoanalysis and Electron Microscopy (CENEM), IZNF, Germany*
[2] *Friedrich-Alexander-Universität Erlangen-Nürnberg, Department of Materials Science & Engineering, Institute I: General Materials Properties, Germany*

In Situ High Energy XRD and Inverse Analysis of Thermal Barrier Coating Behavior

presented by **Mathias LAMARI** [1]
Lara MAHFOUZ [2], Damien TEXIER [3], Loic COURTOIS [4], Sylvain GAILLIEGUE [1], Andrew KING [5], Henry PROUDHON [1], Vincent MAUREL [1]
[1] *MINES Paris - PSL , MAT - Centre des Matériaux, CNRS UMR 7633, France*
[2] *Safran Tech, Etablissement Paris Saclay, France*
[3] *Institut Clement Ader (ICA) - UMR CNRS 5312, Université de Toulouse, CNRS, INSA, UPS, Mines Albi, ISAE-SUPAERO, France*
[4] *3Dmagination, UK*
[5] *Synchrotron SOLEIL, France*

The Beneficial Impact of Ti and Ta Additions on the Creep Strength of Polycrystalline CoNi-base Superalloys

presented by **Steffen NEUMEIER** [1]
Nicolas KARPSTEIN [2], Ashton J. EGAN [1], Mathias GÖKEN [1], Michael J. MILLS [3], Erdmann SPIECKER [2], Andreas BEZOLD [1,3]
[1] *Friedrich-Alexander-Universität Erlangen-Nürnberg, Department of Materials Science & Engineering, Institute I: General Materials Properties, Germany*
[2] *Friedrich-Alexander-Universität Erlangen-Nürnberg, Department of Materials Science & Engineering, Institute of Micro- and Nanostructure Research, and Center for Nanoanalysis and Electron Microscopy (CENEM), Germany*
[3] *Center for Electron Microscopy and Analysis, The Ohio State University, USA*

Cellular Solidification in Laser Powder Bed Manufacturing of Superalloys

presented by **Tresa POLLOCK**
James LAMB, Evan RAEKER
Materials Department, University of California Santa Barbara , USA

A Novel Experimental Approach for the Assessment of the Heterogeneous Nucleation in Investment Cast Superalloys

presented by **Richa GUPTA** [1]
Dmytro SHEVCHENKO [1], Roger REED [2], Joseph MOSES [1], Nils WARNKEN [1], Nick GREEN [1]
[1] *University of Birmingham, UK*
[2] *University of Oxford, UK*

WEDNESDAY 6TH MAY

New-grades Superalloys

16H10-18H

Development and Characterization of new Ni-based Superalloys for Turbine Casing Applications

presented by **Laurane FINET** [1]
Antoine LACOUR-GOGNY-GOUBERT [2], Anne-Laure ROUFFIE [3], Edern MENOU [2], Coraline CROZET [1], Jean-Michel FRANCHET [2], Julien DE JAEGER [2]
[1] *Aubert & Duval, Technical Division, France*
[2] *Safran Tech, France*
[3] *Safran Aircraft Engines, France*

Improvement of Mechanical Properties in a CoNi-based Superalloy Fabricated by Selective Laser Melting through Optimized Heat Treatment

presented by **Chen Li YAN**
Song LU, Lengfei LI, Quiang FENG
State Key Laboratory for Advanced Metals and Materials / University of Science and Technology Beijing, China

Temperature and Strain-Dependent Tensile Deformation Mechanisms of a High-Cr CoNi-based Single-Crystal Superalloys

presented by **Song LU**
Boxuan QU, Longfei LI, Qiang FENG
State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, China

Development of a New Low Thermal Expansion High-strength Superalloy for Elevated Temperature Application

presented by **Ning ZHOU**
Wes T ROTH, Tao WANG, Gian A COLOMBO, Stephane AJ FORSIK, Mario E EPLER
Carpenter Technology Corporation, Reading Pennsylvania, USA

Comparing Creep Behavior of Novel CoNi-based Superalloys and Conventional Ni-based Superalloys Exhibiting Local Phase Transformation

presented by **Ashton EGAN** [1]
Andreas BEZOLD [2], Longsheng FENG [3], Christopher ZENK [1], Julian VÖLKL [1] Yunzhi WANG [2], Michael MILLS [2], Steffen NEUMEIER [1], Erdmann SPIECKER [1], Mathias GÖKEN [1]
[1] *Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg, Germany*
[2] *The Ohio State University, USA*
[3] *Materials Science Division, Lawrence Livermore National Laboratory, USA*

Poster Session

18H – 20H

Thursday 7th may program

08H30 - 10H10
ICME - Digital Twins for Materials and Processes
Plenary room

COFFEE BREAK

10H40 – 11H40
Keynote lecture T. Pollock
Plenary room

11H40 – 12H40
Awards ceremony & Closure
Plenary room

LUNCH

14H
Departure

THURSDAY 7TH MAY

ICME - Digital Twins for Materials and Processes

8H30 – 10H10

Influence of Instantaneous Strain Rate Changes on the Microstructural Evolution of Inconel 718 through Full Field Simulations

presented by Nadine **ELEKYABI**
Holger BRÜGGEMANN, Emad SCHARIFI
Institute of Metal Forming (IBF), RWTH Aachen University, Germany

Novel Multi-class Grain Size Model and Yield Stress Prediction for UDIMET720LI

presented by **Drazen BRESCAKOVIC** [1]
Thomas HÖNIGMANN [1], Johannes NEUMÜLLER[1], Christian GRUBER [2], Peter RANINGER [1], Philipp RETZL [3,4], Vitor RIELLI [5], Konstantin PRABITZ [6], Sophie PRIMIG [5], Martin STOCKINGER [6], Gerald RESSEL [1]
[1] *Materials Center Leoben Forschung GmbH, Austria*
[2] *voestalpine BÖHLER Aerospace GmbH & Co KG, Austria*
[3] *MatCalc Engineering GmbH, Austria*
[4] *Technische Universität Wien, Austria*
[5] *University of New South Wales, Australia*
[6] *Montanuniversität Leoben, Austria*

High-throughput Automated Evaluation of Composition-Aging Temperature-Precipitate Geometry Relations in a Ni-base Superalloy

presented by **Thomas HOEFLER**
[1] Ayako IKEDA [1], Makoto OSAWA [1], Kyoko KAWAGISHI [1], Toru HARA [1], Takahito OHMURA [1], Daichi AKAMA [2], Masaki TANEIKE [2], Toshio OSADA [1]
[1] *NIMS, Japan*
[2] *Mitsubishi Heavy Industries, Japan*

Process-Structure modeling of Polycrystalline Ni-based Superalloys using Microstructure Informatics and Deep Learning Neural Networks

presented by **Pascal THOME**
Luis ARCINIAGA, Sammy TIN
Materials Science and Engineering, University of Arizona, USA

Creep Modeling in Porous Superalloy Crystal displaying Tension-Compression Asymmetry

presented by **Oana CAZACU**
Benoit REVIL-BAUDARD
The University of Arizona, Department of Materials Science & Engineering, USA

THURSDAY 7TH MAY

10H40 - 11H40

Keynote lecture Tresa POLLOCK

3D Insights on 3D Printed Superalloys

Plenary room

Additive manufacturing promises a major transformation of the production of high economic value metallic materials, enabling innovative, geometrically complex designs with minimal material waste. While 3D printed superalloys are likely to replace cast components in many applications, there is not a detailed understanding of the differences in cast vs. additive structure. TriBeam tomography, which integrates electron, ion and femtosecond laser beams to acquire high resolution chemical, structural and crystallographic information has been employed to study Ni- and CoNi-base printed materials. New insights on 3D aspect of printed structure, including cell/dendrite and grain morphology evolution, misorientation accumulation, defect formation and melt pool dynamics will be reviewed. Differences in single crystal vs. additive structure will be highlighted, along with implications for properties. Future directions for the design of "printable" alloys will also be discussed.

Tresa M. POLLOCK, Alcoa Distinguished Professor of Materials, University of California, Santa Barbara
with James LAMB & Evan RAEKER.

Poster Session Room 1

Additive Manufacturing

15 Tensile Behavior of a PBF-LB/M VDM780 Alloy Studied as a Function of γ' Precipitation State and Temperature
Louis HÉBRARD, Jan HAUBRICH, Joachim GUSSONE, Sina PETSCHEL, Juri MUNK, Mauro MADIA, Itziar SERRANO-MUNOZ

31 Material Characterization of L-DED-w HAYNES 233 Alloy
Matilda MOBERG LARSSON, Niklas JOHANSSON, Prajina BHATTACHARYA, Fang LIU

58 In625 Fabricated by Metal Binder Jetting and Cold Metal Fusion: High temperature Mechanical Properties and Microstructure Characterization
Gautier HUSER, Aliénor ROYER, Frédéric ADAMSKI, Karine NGUYEN, Pierre SALLOT

97 Microstructure-dependent Mechanical Properties and Optimization of Post-weld Heat Treatment in an Electron Beam Welded Ni Based Superalloy
Haijing ZHOU, Hongyao YU, Hailong QIN, Jinli XIE

101 Effect of Microstructural Control on Creep Performance in ATI 718Plus Manufactured by PBF-LB
Dominik BIELAK, Yuanbo TANG, Jürgen OLBRICHT, Birgit SKROTZKI, Moataz ATTALLAH

121 Multiscale Microstructural Understanding of an Additively Manufactured MCrAlY Coating for High-Temperature Applications
Ingrid BERGHEIM, Katerina CHRISTOFIDOU, Felicity FREEMAN, Jack BATTY, Paraskevas KONTIS

Advanced Characterizations

98 **Investigation on The Long-Term Aging Microstructure Evolution of Cobalt-Based Superalloy ECY768**
Zhicheng WANG, Lijie QIAO, Haijing ZHOU, Xiaofei YUAN, Hailong QIN, Jinli XIE

113 **Investigation of Internal Residual Stress Evolution in Additive Manufacturing High-Performance Superalloys During Heat Treatment Processes via Neutron Diffraction & Contour Method**
Renren ZHENG, Songyi SHI, Mingzhao XIE, Yixin CHEN, Zhimin SUN, Jinli XIE, Hailong QIN

122 **Casting of Single-Crystal, Single-Phase Nickel-Based Superalloys with Varying Re-Content**
Julia KNAPP, Rainer VÖLKL, Florence PETTINARI-STURMEL, Uwe GLATZEL

145 **The LASAT and LASDAM Methods to Evaluate the Interface Strength of TBCs in Air and Water Vapor Environments**
Eliott DEGOUILLES, Vincent GUIPONT, Vincent MAUREL, Filofteia-Laura TOMA, Radosław SWADŹBA, Ravisankar NARAPARAJU, Boguslaw MENDALA

148 **Artificial Defects Processed by Laser Shock to Mimic Thermal Barrier Coating Damage Mechanisms**
Paul COLOMBEL, Vincent GUIPONT, Florent COUDON, Aurélien JOULIA, Lara MAHFOUZ, Vincent MAUREL

Blade Alloys - Mechanical Behavior

12 **Effect of Strain Amplitude on the Thermomechanical Fatigue Damage Behavior of a Thermal Barrier-Coated Fourth-Generation Nickel-Based Single Crystal Superalloy**
Shichao HAN, Guang XIE, Dong WANG, Wei ZHENG, Shaohua ZHANG, Jianchao PANG, Shumeng JIANG, Jian ZHANG

37 **On the Evolution of the Microstructure of Single Crystal Superalloy (SX) Airfoils under Dynamic Loads**
Takuma SAITO, Christoph SOMSEN, Antonín DLOUHÝ, Thomas GÖHLER, Markus FRIED, Gunther EGGELER

42 **Influence of Dendritic Segregation on local γ' Precipitate Structure and Creep Properties of Ni-Based Superalloys**
Sean BÖHM, Andre BORSATTO BALDISSERA, Rainer VÖLKL, Uwe GLATZEL

54 **Microstructure Evolution and Tensile Property Degradation of DZ409 Alloy under Long-Term Thermal Exposure in a Temperature Range of 750°C to 980°C**
Lei WANG, Yang LIU, Xiu SONG, Huaijin CHEN, Yuehan FENG, Baoping WU, Jiantao WU

60 **Creep Properties of a First Generation Ni-Based SX Superalloy as a Function of its Original Microstructure**
Mathilde MÉLET, Jérémy RAME, Luciana Maria BORTOLUCI ORMASTRONI, Jonathan CORMIER

62 **Effect of MCrAlY Coating on the Creep Properties of a Directionally Solidified Superalloy**
Xin ZHAN, Dong WANG, Jian ZHANG

89 **Effect of Heat Treatment Conditions on Microstructural Evolution and High-Temperature Creep Performance of Nickel-Based Single Crystal Superalloys**
Zijin LIU, Wenqi GUO, Haigen ZHAO, Yanling PEI, Shusuo LI, Shengkai GONG

96 **Topologically Closed Packed Phase and its Interaction with Dislocation Movement in Ni-based Superalloy during High-Temperature Creep**
Wenqi GUO, Haigen ZHAO, Yi RU, Yanling PEI, Shengkai GONG, Shusuo LI

108 **Creep Behavior and Mechanism of a Notched γ'-Rich Ni-Based Single Crystal Superalloy at High Temperature**
Haigen ZHAO, Wenqi GUO, Peiyun BAO, Junwu WANG, Shusuo LI

112 **Effect of Coatings on Creep Property of a Directionally Solidified Superalloy**
Zhongkai SUN, Xin ZHAN, Dong WANG, Jian ZHANG

114 **Microstructural Evolution during Heat Treatment and high Temperature/ Low Stress Creep of Re-free Single Crystal Superalloy ERBO/15**
Jonathan STREITBERGER, Oliver MARTIN HORST, Gunther EGGELER

116 **Stress Sensitivity Analysis of Ultrahigh-Temperature Creep in Nickel-Based Superalloy**
Jie ZHANG, Jiapeng HUANG, Geng LI, Hang SU, Heng ZHANG, Wenqi GUO, Haigeng ZHAO, Yanling PEI, Shusuo LI, Shengkai GONG

118 **Influence of Stress States on Rafting Kinetics during Creep of Nickel-Based Single Crystal Superalloys**
David BÜRGER, Gunther EGGELER

119 **Dual Effects of γ' Phase Volume Fraction and Interface Mismatch Optimization on 1200°C Ultrahigh-Temperature Creep Resistance in Ni_3Al-Based Single Alloy**
Geng LI, Haodong DUAN, Jie ZHANG, Hang SU, Wenqi GUO, Haigeng ZHAO, Heng ZHANG, Yanling PENG, Shusuo LI, Shengkai GONG

131 **On the Influence of Trace Elements on Microstructures and High Temperature Properties of Single Crystal Ni-Base Superalloys**
Nico PAUFLER, Thomas GÖHLER, Jan FRENZEL

154 **Thermo-Mechanical Fatigue Crack Growth of a Coated Superalloy**
Louise MARIOTON, Matthieu RAMBAUDON, Jean-Michel SCHERER, Brice LE PANNERER, Nicolas LEOST, Vincent MAUREL

160 **In-Situ Micromechanical Characterization of Single Crystalline Ni-Based Superalloys using a Micro-Cantilever Technique**
Felicitas WERNER, Janine PFETZING, Gunther EGGELER, Jan FRENZEL

Blade Processing

41 **Effect of Solidification Rate on the Microstructure of LEKv – 94 Nickel-Based Superalloy**
André BALDISSERA

81 **Numerical Optimization of Directional Solidification Process Parameters for Nickel-based Superalloys**
YiLin LI, Enhui WANG, Xinmei HOU

88 **The Effect of Carbon Content on the Solidification Behavior in a Mo-Rich Single Crystal Superalloy**
Xiaoyu SONG, Tianyu ZHANG, Wenqi GUO, Haigen ZHAO, Yanling PEI, Shusuo LI, Shengkai GONG

141 **A [111]-Oriented Nickel-Based Single Crystal Superalloy against 1150°C with Low Density And Low Cost**
Zhuoyang LI, Yi RU, Yuanhang GAO, Wenyue ZHAO, Yanling PEI, Shusuo LI, Shengkai GONG, Huibin XU

Poster Session
Room 2

Disk Alloys - Mechanical Behavior

8 Microstructure-Based Modeling of Temperature-Dependent Yield Strength in Polycrystalline Ni-Based Superalloys
Uwe GLATZEL, Enrique GALINDO-NAVA, Howard J. STONE, Moritz MÜLLER

84 Tensile Properties Degradation of N18 during Overaging
Guillaume BURLOT, Benjamin FLAGEOLET, Christian DUMONT, Clément LE GALL, Jonathan CORMIER

91 Dependence of Yield Strength Anomaly on Strain Rate in a Novel Powder Metallurgy Ni-based Superalloy
Haopeng ZHANG, Tian TIAN, Ting YAN, Yingnan SHI, Jian JIA, Yiwen ZHANG

92 Time and Strain Dependence of the long-term Creep Behaviors of High-Cr Re-free Ni-based Single-crystal Superalloys for Industrial Gas Turbines: A Comparative Study with Re-containing Alloys
Muchun HOU, Fan LU, Longfei LI, Song LU, Dong WANG, Jian ZHANG, Qiang FENG

138 Effect of Cooling Rate on the Microstructure and Mechanical Properties of Waspaloy
Anchal GOYAL

140 Revealing the Influence of Temperature, Stress and Strain Rate on Deformation Mechanisms of the Ni-based Superalloy Udimet 720Li
Julian VÖLKL, Florian FISCHER, Benedikt DIEPOLD, Lisa P. FREUND, Mathias GÖKEN, Steffen NEUMEIER

149 Cooling Rate Sensitivity and its Effect on the Microstructure and Mechanical Properties of Forged Ni-base Superalloys
Svetoslava TSANKOVA, Andreas HAUSMANN, Masood Hafez HAGHIGHAT, Bodo GEHRMANN, Angela QUADFASEL, Thomas WITULSKI, Steffen NEUMEIER

143 Dwell-Fatigue Crack Propagation in a Wrought Ni-base Superalloy: Effects of Tensile Dwell and Oxygen
Shiyu SUZUKI, Zhiqi CHEN, Yuya UEMURA, Satoshi UTADA, Hideaki NISHIKAWA, Toshio OSADA, Yu KUROKAWA, Motoki SAKAGUCHI

Disk Processing

106 Optimization of Mechanical Properties in a Novel Nickel-Based Superalloy GH4251 via Pre-Engineered Substructures
Hongyao YU, Jinxin DONG, Caiyu GUO, Zhongqiu LIU, Hailong QIN, Jinli XIE, Zhongnan BI

111 Role of Degassing Pre-treatment on the Microstructure and Mechanical Properties of a PM Ni-base Superalloy
Qiang ZHANG, Yixing WANG, Minxi WANG, Tian TIAN, Mingdong LIU, Jiantao LIU

134 Evaluation of Machining Deformation in RR1000
Jonah SHRIVE, Henry BOYLE, Matthew BROWN, Lewis OWEN, Susanne NORGREN, Alex GRAVES, Rachid M'SOUBI, Mark HARDY, Jamie MGGOURLAY, Katerina CHRISTOFIDOU

157 Metadynamic Recrystallization and Grain Growth During Ingot-to-Billet Conversion of a Ni-Based Superalloy: JMAK Modeling and Experimental Validation
Liam HUSTON, Jose GONZALEZ-MENDEZ, Austin DICUS, Mario EPLER, Stephane FORSIK

158 **Development, Design and Prototype forging of an UDIMET720LI Turbine Disk for next Generations Aero Engines**
Christian GRUBER, Flora GODOR, Aleksandar STANOJEVIC

A3 **Advanced Prediction of Remelting-Related Defects in the VAR Process**
Abdellah KHARICHA, Ebrahim KARIMI-SIBAKI, Mehran ABDI, Chenbo XU, Menghuai WU

Environmental Resistance

7 **Novel Analysis of High Temperature Corrosion Products and Porosity on Uncoated Single Crystal RenéN5 Superalloy**
Roger MADDALENA, Alice SCARPELLINI, Marc LIU, Stoichko ANTONOV, Jonathan CORMIER, Nicolas RIVAS

28 **Effect of Pt-Al coating on High-Temperature Creep Performance in a Ni-based Single Crystal Superalloy**
Yawei LI, Li WANG, Jian ZHANG

32 **Cyclic Oxidation Behaviour of Al9Co25Cr8Fe15Ni36Ti6X1 with Minor Alloying Additions at 750 °C**
Anke Silvia ULRICH, Sebastian HAAS, Anna Maria Manzoni, Uwe GLATZEL

53 **Negative Creep and Isothermal Oxidation Behavior of Inconel 783**
Konstantin MÜLLER, Benedikt ALBERT, Rainer VÖLKL, Uwe GLATZEL

68 **Cognition on the Oxidation Behavior of Ni-based Superalloy GH4742 when Exposed to Water Vapor**
Hui XU, Enhui WANG, Xinmei HOU

137 **Towards Understanding Deformation Mechanisms of H Embrittlement in Ni-based Alloys**
Yutaro OKI, Tomohiro ANDO, Yoshihiko KOYANAGI, Hiroto KITAGUCHI, Yu-Lung CHIU

155 **Thermal Barrier Capacity of the Coating on Single Crystal Superalloy: a Destructive Burner rig Test with Structural Simulation Component**
Xinyu ZHANG, Yi RU, Bin HU, Huidong WU, Shusuo LI, Yanling PEI, Shengkai GONG

171 **Influence of Hot Corrosion Pits on Short Fatigue Crack Growth**
Elise PERUSE, Justine BONNAL, Stephane KNITTEL, Cécilie DUHAMEL, Stéphane MATHIEU, Matthieu RAMBAUDON, Benoit MANSOZ, Vincent MAUREL

ICME - Digital twins for materials and processes

23 **Machine Learning for Microstructural Prediction on IN718 industrial Parts**
Antoine GOMOND, Yann JANSEN, Eric GEORGES

30 **Prediction of Plastic Deformation Behavior in Complex Multi-Component L12 Precipitates**
Yingchun TANG, Wei Li, Levente VITOS, Florian PYCZAK

33 **Knowledge-informed Graph Attention Networks enable Defect-free Alloy Design for Laser Additive Manufacturing**
Hao YU, Wei XU

35 **Building a Quantitative Relationship among Microstructure-defects-property of Superalloys based on Multimodal Convolutional Neural Network**
Huipeng YU, Maodong KANG, Jun WANG, Baode SUN

51 **Microstructural Prediction of Inconel 718 during High Strain Rate Process Conditions using DIGIMU®**
Franco JAIME, Pascal De MICHELI, Jonathan DARION, Olena DANYLOVA, Baptiste FLIPON, Marc BERNACKI

52 **Digital Material Design Guidelines for Ni-Based Alloys**
Vsevolod RAZUMOVSKIY

70 **Unveiling the Effect of Stress on Vacancy Diffusion Isotropy at High Temperature in Ni-Re systems: Insights from Atomic Simulations**
Shichao DU, Siyuan LIN, Wenyue ZHAO, Yi RU, Yanling PEI, Shusuo LI, Shengkai GONG

73 **Dynamics of Unlocking Kear-Wilsdorf locks with Machine-learning-based Interatomic Potential**
Xiang XU, Xi ZHANG, Erik BITZEK, Blazej GRABOWSKI

153 **Machine Learning for the Computational Design of Single-crystal nickel-base Superalloys**
Matthieu DEGEITER, Edern MENOU, Patricia KLOTZ, Armand BARBOT, Didier LOCQ, Sami BEN ELHAJ SALAH, Thibaut FROELIGER, Yohan COSQUER, Mikael PERRUT

New-grades superalloys

142 **A Nickel-Based Powder Metallurgy Superalloy with High-Temperature Capability: Strengthening Effect of High (W, Ta) Content**
Ting YAN, Xiaokun LI, Jiaming BAI, Haopeng ZHANG, Jian JIA, Jiantao LIU, Yiwen ZHANG

2 **Evaluation of the Development of Microstructural and Chemical Gradients in γ/γ' Superalloys Prepared by spark Plasma Sintering**
Thibaut FROELIGER, Louis METAYER, Etienne RIMPOT, Didier LOCQ, Mathilde LAURENT-BROCQ

9 **Novel Wrought Polycrystalline Co/Ni-Base Superalloys**
Cameron CRABB, Geri TOPORE, James O. DOUGLAS, Mark HARDY, Shelly CONROY, David DYE

34 **Osmium Effect in Single Crystal Nickel Base Superalloys**
Zaiwang HUANG

49 **The influence of Zr content on the grain boundary segregation and inter-phase distribution behavior in a novel nickel-based PM superalloy [49]**
Jian Jia, Ying Nan Shi, Ting Yan, Hao Peng Zhang, Yi Wen Zhang

86 **Development of a Novel Cast Nickel-Based Superalloy (K4800) for Large Complex-Structured Hot-End Components Operating at 800-850 °C**
Min WANG, Xian-Chao HAO, Yingche MA

A2 **In Situ Study on the Effect of W on Precipitation in high-Ta-containing Nickel Superalloys**
Romain BOURDAIS, Thomas VAUBOIS, Edern MENOU, Vladimir A. ESIN

Repair, Refurbishment, Recycling

18 **Recycling and Purification of Superalloy Scrap via Hydrogen Plasma Arc Melting**
Peng ZHAO, Shufeng YANG

102 **Exploring Oxides for Removing Impurity Si in Ni-base Superalloys During Vacuum Induction Melting Process**
Masaki DOBASHI, Shizuna OYANO, Naoki OHNO, Chihiro TABATA, Yuji TAKATA, Satoshi UTADA, Toshio OSADA, Kyoko KAWAGISHI, Shinsuke SUZUKI

117 **Nondestructive Inspection of Recrystallization in Single Crystal Ni-Based Superalloys by X-ray Laue Method**
Ayumi NAKAYAMA, Shinya IWASAKI, Daisuke KOBAYASHI, Toshikatsu TATEISHI

130 **Joining Ni-based Superalloys with Compositionally Complex Filler Alloys**
Jonas VOGLER, Benjamin SCHNEIDERMAN, Zhenzhen YU, Rainer VÖLKL, Uwe GLATZEL

45 **The Effect of Ca Additions on the Mechanical Properties of an Advanced Polycrystalline Ni-base Superalloy**
George WISE, Mark HARDY, Nicholas JONES, Howard STONE

Superalloys for Power Generation