

Dates and Location

The Fourth International Special Emphasis Symposium on Superalloy 718, 625, 706 and Derivatives will be held June 15-18, 1997 at the Embassy Suites Hotel, Pittsburgh, Pennsylvania.

Organizing Committee

E.A. Loria	Chairman, Consultant
A. Banik	Special Metals
W.B. Eisen	Crucible Materials
J.M. Hyzak	Wyman-Gordon Co.
L.A. Jackman	Teledyne Allvac
R.L. Kennedy	Teledyne Allvac
G.W. Kuhlman	Alcoa Forged Products
G.E. Maurer	Special Metals
A. Mitchell	University of British Columbia
N. Paton	Howmet Corporation
D.F. Paulonis	Pratt & Whitney Aircraft
J.F. Radavich	Purdue University
E.L. Raymond	GE Aircraft Engines
P.O. Schilke	GE Power Generation
R.G. Thompson	University of Alabama
J.H. Tundermann	INCO Alloys International

Corresponding Members

Y. Honnorat	SNECMA
A. Pineau	Paris School of Mines
X. Xie	UST Beijing

Symposium Co-Sponsors

The Minerals, Metals & Materials Society is the administering sponsoring society for the symposium. The event is being cosponsored by ASM International, NACE International and the Nickel Development Institute.

Scope/Topics

This Fourth International Symposium on Superalloys 718, 625, 706 and Various Derivatives follows in the tradition of the three predecessors. The initial one on Superalloy 718 was held in 1989 and was devoted solely to this unique alloy. The second Symposium, held in 1991, extended the scope to include Alloy 625, from which Alloy 718 was derived, along with their modifications. The third Symposium, held in 1994, added Alloy 706, a natural derivative of Alloy 718, which has gained increasing application in land-based gas turbines for the generation of electric power.

This Symposium covers all aspects of the development, production, behavior and use of these most important superalloys. It is indeed noteworthy that so much interest and activity continues on these superalloys which have been in existence and usage for many years. There are 92 papers which were accepted for this program with nearly a third of the papers coming from overseas. Together with its predecessors, the Symposium volume reviews worldwide developments on the theory, technology and application of Superalloys 718, 625, and 706.

Symposium Registration

Registration fee includes admission to all technical sessions, the Welcoming Reception, Monday, Tuesday & Wednesday luncheons, coffee breaks and a bound copy of the symposium proceedings will be held beginning Sunday and continue through Wednesday in the Atrium Area during the following hours:

Sunday, June 15.....	4:00 PM-7:00 PM
Monday, June 16.....	7:00 AM-5:00 PM
Tuesday, June 17.....	7:00 AM-5:00 PM
Wednesday, June 18.....	7:00 AM-1:00 PM

Technical Sessions

The Fourth International Special Emphasis Symposium on Superalloy 718, 625, 706 and Derivatives will commence on Sunday, June 15, 1997. Technical sessions will be held at the Embassy Suites Hotel, in Salons B&C Monday through Wednesday. Session and paper titles are included in this brochure. Entire paper appears in the proceedings.

Authors' Coffee

Monday through Wednesday, authors and session chairmen are asked to attend the Authors' Coffee on the day of your presentation. Continental breakfast is served in the Pantry each day from 7:00AM - 8:15AM. All authors and session chairmen should plan to attend on the day of their presentation.

Slide Preview Area

Authors are invited to preview their slides at the Slide Preview Area, located in Suite on the first floor (to be determined), during the following hours:

Monday, June 16.....7:00AM - 4:30PM

Tuesday, June 17.....7:00AM - 4:30PM

Wednesday, June 18.....7:00AM - 1:00PM

Policy on Audio and Video Recording of Technical Paper Presentations/Sessions

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Conference Proceedings

A proceedings volume, containing papers from both oral and poster presentations, will be available at the meeting. One copy is included in the registration fee.

Social Functions

Various social functions have been planned to supplement the formal technical program, including the following:

Sunday Evening.....Welcoming Reception

Monday, Tuesday, Wednesday.....Luncheons

These functions are included in the registration fee for full-conference registrants. Luncheon tickets for students and accompanying persons may be purchased at the conference registration desk. Welcoming Reception is complimentary to all attendees and guests.

Destination Highlights

Pittsburgh, Pennsylvania

Situated between wooded hillsides at the point where the Allegheny and Monongahela Rivers converge to form the Ohio River, Pittsburgh is one of America's most scenic cities. With average daily high temperatures of 80^o, June is a very pleasant time to visit Pittsburgh.

While in Pittsburgh you will want to take an incline ride up Mount Washington, but inclines aren't the only mode of travel in or to the city. Pittsburgh is a very accessible city. The convenient subway, light rail, and bus systems enable any destination within the city to be within a half-hour ride. Easy entrance to a network of interstate highways (East-West I-70, I-76, I-80, I-376; North South: I-79, I-579, I-279) puts Pittsburgh within a day's drive of most Eastern U.S. Cities, and the new Pittsburgh International Airport has made the city conveniently accessible from anywhere in the world.

Delegates can easily take advantage of the many entertainment, cultural, and dining opportunities the city has to offer. The "Strip District" is a smorgasbord of dining and entertainment options. The Carnegie Science Center has been called "The Amusement Park for the Mind". The city is rich in cultural activities and is home to hundreds of performing arts groups. And don't forget Pittsburgh sports. With major league championship teams like Pirates baseball there is always a big game in town.

Materials Week '97

September 14-18, 1997

Indiana Convention Center • Indianapolis, Indiana

Second International Symposium on Structural Intermetallics

September 21-26, 1997

Seven Springs Mountain Resort • Champion, Pennsylvania

1998 TMS Annual Meeting & Exhibition

February 15-19, 1998

San Antonio Convention Center • San Antonio, Texas

TECHNICAL PROGRAM

Sunday Evening, June 15, 1997

6:45-7:45 PM.....Complimentary Reception

Introductory Overviews

8:00-8:30 PM (Introduction by E.A. Loria, Consultant)

Spraycast-X IN718 Processing Benefits:

N.E. Paton, and K. Bowen, Howmet Technical Center, Whitehall, MI; and A. Cabral, Pratt & Whitney Aircraft, E. Hartford, CT

8:30-9:15 PM (Introduction by E.A. Loria, Consultant)

Electron Metallography of Alloy 718:

John F. Radavich, Professor Emeritus, Purdue University, W. Lafayette, IN

MONDAY, AM JUNE 16, 1997

Session I: Melting, Casting and Processing

Session Chairmen:

G. Maurer, Special Metals Corporation and A. Mitchell, University of British Columbia

8:30 am

Modern Control Strategies for Vacuum Arc Remelting of Segregation Sensation Alloys:

Rodney L. Williamson, M. Eric Schlienger, Sandia National Laboratories, Albuquerque, NM; Christopher L. Hysinger, Joseph J. Beaman, University of Texas at Austin, Department of Mechanical Engineering, Austin, TX

8:50 am

Centre Segregation, Freckles and Development Directions for Nb-Containing Superalloys:

P. Aubertin, S.L. Cockcroft, A. Mitchell, and A.J. Schmalz, Department of Metals and Materials Engineering, University of British Columbia, Vancouver, Canada

9:10 am

Stochastic Modeling of Solidification Structure in Alloy 718 Remelt Ingots:

L. Nastac, S. Sundarraj, K.O. Yu, Concurrent Technologies Corporation, Johnstown, PA

9:30 am

Phase Formation Modeling of an Alloy 706 Casting Using Computational Thermodynamics:

B.A. Boutwell, R.G. Thompson, University of Alabama at Birmingham, Birmingham, AL; N. Saunders, Thermo Tech Ltd., Guildford-Surrey UK; J.J. deBarbadillo, S.K. Mannan, Inco Alloys, Inc., Huntington, WV

9:50 am

Influence of Bulk Convection on Freckle Formation in Casting:

V. Sahai, P. Banerjee, R.A. Overfelt, Auburn University, Space Power Institute, Auburn, AL

10:10-10:30 am Coffee

10:30 am

Investigation of Thermal Cracking of Large-Diameter 706 Ingots:

Ramesh S. Minisandram, Laurence A. Jackman, Charles B. Adaszczik, Teledyne Allvac, Monroe, NC; Rajiv Shivpuri, Industrial & Systems Engineering, Ohio State University, Columbus, OH

10:50 am

Large Alloy 718 Forgings for Land-Based Turbines:

R. Schwart, S.V. Thamboo, A.F. Anderson, GE Power Generation; C.B. Adaszczik, B.J. Bond, L.A. Jackman, Teledyne Allvac, Monroe, NC; J.F. Uginet, Fortech Airforge, Pamiers, France

11:10 am

Manufacturing of Large IN706 and IN718 Forging Parts:

M. Petit, J.P. Fesland, Aubert & Duval, France

11:30 am

Three Dimensional Computer Simulation of Alloy 718 Ingot Breakdown by Cogging:

D. Zhao, R. Anbajagane, S. Cheng, H. Dong, Concurrent Technologies, Johnstown, PA; F.S. Suarez, R.A. Jaramillo, Inco Alloys International, Inc., Huntington, WV

MONDAY, PM

Session II: Advances in Processing

Session Chairmen:

J. Hyzak, Wyman-Gordon and L. Jackman, Teledyne Allvac

1:15 pm

Ultra Fine Grain Processing for Superplastic Forging of U-718:

C.A. Petri, T. Deragon, and F.A. Schweizer, Special Metals Corporation, New Hartford, NY; John Schirre, Pratt & Whitney Aircraft, Hartford, CT

1:35 pm

Uniformity of Properties in Alloy 706 Through Control of Forging and Heat Treatment:

Martin M. Morra, Peter Jepson, Wyman Gordon Company, North Grafton, MA

2:00 pm

Effect of Processing Parameters on the Kinetics of Grain Coarsening in P/M 718:

A.S. Watwe, D.M. Weaver, Wyman Gordon Forgings, Houston, TX; J.M. Hyzak, Wyman Gordon Company, North Grafton, MA

2:25 pm

First and Second Tier Properties of HIP'ed and Forged P/M Inconel 706:

U. Habel, F.J. Rizzo, J.J. Conway, Crucible Materials Corporation; R. Pishko, V.M. Sample, G.W. Kuhlman, Alcoa Forging Division, Cleveland, OH

2:45-3:00 pm Coffee

3:00 pm

Effect of Hot Deformation Parameters on the Grain Size of Wrought IN718:

J.M. Zhang, L.Z. Ma, J.Y. Zhuang, Q. Deng, J.H. Du, Z.Y. Zhong, Department of Superalloys, Central Iron and Steel Research Institute, Beijing, China; P. Janschek, Thyssen Umformtechnik, Remscheid, Germany

3:25 pm

Thermomechanical Behavior and Microstructure Development of Alloy 706:

Samual V. Thamboo, GE Power Systems, Schenectady, NY

3:45 pm

Evolution of Microstructure during Hot Rolling of Alloys 625 and 718:

D.E. Camus, R.A. Jaramillo, J.A. Plyburn, F.S. Suarez, Inco Alloys International, Inc., Huntington, WV

4:05 pm

Clean Metal Spray Forming:

W.T. Carter, M.G. Benz, J.K. Browning, R.J. Zabala, B.A. Knudsen, GE Corporate R & D, Schenectady, NY; R.M. Forbes-Jones, R.M. Davis, Teledyne Allvac, Monroe, NC

4:25 pm

Process Modeling the Superplastic Forming Behavior of Inconel Alloy 718SPF:

Gaylord D. Smith, Stanley R. Gregory, Inco Alloys International Inc., Huntington, WV; Yun Ma, Yong Li and Terence G. Langdon, Department of Materials Science and Mechanical Engineering, Los Angeles, CA

4:45 pm

Room Temperature Formability of Inconel Alloys 625LCF, 718 and 718 SPF:

P. Roamer, Howmet Corp., Dover, NJ; C.J. Van Tyne, D.K. Matlock, A.M. Meier, Colorado School of Mines, Golden, CO; H. Ruble, F.S. Suarez, INCO Alloys International, Huntington, WV

TUESDAY, AM JUNE 17, 1997

Session III: Physical Metallurgy

Session Chairmen:

Ray Thompson, University of Alabama and K.-M. Chang, West Virginia University

8:30 am

Solidification Modeling of Nb Bearing Superalloys:

J.N. DuPont, A.R. Marder, Lehigh University, Bethlehem, PA; C.V. Robino, Sandia National Laboratory, Albuquerque, NM

8:50 am

Recrystallization Prediction During Forging Process:

B. Marty, J.Y. Guedou, SNECMA, France; P. Gergaud, MATOP, France; J.L. Lebrun, ENSAM, France

9:10 am

Study of Secondary Grain Growth in IN718 Alloy:

J.F. Uginet, Fortech, Pamiers and B. Pieraggi, ENSCT, France

9:30 am

New DTA Approach for Verifying Precipitate Solvus in Inconel 718:

Ling Yang, Keh-Minn Chang, West Virginia University, Morgantown, WV; Sarwan Mannan, John deBarbidillo, Inco Alloys Inc., Huntington, WV

9:50 am

Effect of Cooling Rate from Solution Heat Treatment on Precipitation Behavior and Mechanical Properties of Alloy 706:

Takashi Shibata, Tatsuya Takahashi, Yukoh Shudo, Mikio Kusuhashi, Jun-ichi Taira, Tohru Ishiguro, The Japan Steel Works Ltd., Hokkaido, Japan

10:10-10:30 am Coffee

10:30 am

Evolution of an Alloy 718 Microstructural Evolution Model:

R.A. Jaramillo, F.S. Suarez, J.A. Plyburn, D.E. Camus, R.W. Evans, Inco Alloys International, Inc., Huntington, WV

10:50 am

Microstructural Characterization of Superalloy 718 with Boron and Phosphorus Additions:

J.A. Horton, C.G. McKamey, M.K. Miller, Metals and Ceramics Division, Oak Ridge National Lab, Oak Ridge, TN; W.D. Cao, R.L. Kennedy, Teledyne Allvac, Monroe, NC

11:10 am

Microanalysis of Fatigue Cracks in IN706 and IN718:

A.M. Ritter, M. Larsen, E.L. Hall, R.G. Bolon, A. Linsebigler, M.F. Henry, GE Corporate Research and Development, Schenectady, NY

11:30 am

Effect of Alpha Chromium on Long Time Behavior of Alloy 718:

John F. Radavich, Micro-Net Laboratories, W. Lafayette, IN

TUESDAY, PM

Session IV: Mechanical Behavior

Session Chairmen:

S.R. Patel, Inco Alloys, D.F. Paulonis, Pratt & Whitney Aircraft

1:15 pm

Effect of Compositional Modifications on the Mechanical Behavior of IN706:

M. Nazmy, C. Nosedá, M. Staubli, ABB Power Generation, Switzerland

1:35 pm

The Influence of Heat Treatment on the Mechanical Behavior of IN706:

G. Härkegård, W. Balbach and K. Stärk, ABB Power Generation Ltd., Switzerland; J. Rösler, Technical University of Braunschweig, Germany

2:00 pm

Effect of Minor Elements on Microstructure and Mechanical Properties of In718 Alloy:

Shouren Guo, Wenru Sun, Dezhong Lu, Zhuangqi Hu, Institute of Metal Research, Shenyang, China

2:25 pm

Development of an Improved Heat Treatment for Investment Cast Inconel 718 (PWA649):

John J. Schirre, Pratt & Whitney Aircraft, East Hartford, CT

2:45-3:00 pm Coffee

3:00 pm

Mechanical Properties of Microcast-X 718 for Aerospace and SSME Applications:

G.K. Bouse, Howmet Technical Center; R. Dunham, Howmet Hampton Casting, Whitehall, MI

3:25 pm

Microstructure and Mechanical Property Characterization of Inconel Alloys 625 and 625 LCF Aged at Intermediate Temperature:

C.R. Conder, G.D. Smith, Inco Alloys, Huntington, WV; J.F. Radavich, Micro-Net Labs., W. Lafayette, IN; Xishan Xie, UST-Beijing, China

3:45 pm

Elevated Temperature Tensile and Creep Rupture/Properties of Inconel Alloy 725:

Edward L. Hibner, Howard W. Sizek, Inco Alloys International, Huntington, WV

4:05 pm

Multicomponent Intergranular and Interfacial Segregation in Alloy 718 with Correlations to Stress Rupture Behavior:

J.X. Dong, R.G. Thompson, Department of Materials and Mechanical Engineering, University of Alabama at Birmingham, AL; X.S. Xie, University of Science and Technology Beijing, China

4:25 pm

Segregation Behavior of Phosphorus and its Effect on Microstructure and Mechanical Properties in Alloy System Ni-Cr-Fe-Mo-Nb-TiAl:

Xishan Xie, Jianxin Dong, Yaohe Hu, Xingbo Liu, Zhichao Xu, Yaoxiao Zhu, UST-Beijing, China; R.G. Thompson, University of Alabama

WEDNESDAY, AM JUNE 18, 1997

Session V: Creep, Fatigue and Long Time Properties

Session Chairmen:

J. Radavich, Micro-Met Labs and Greg Bouse, Howmet

8:30 am

Effect and Mechanism of Phosphorous and Boron on Creep Deformation of Alloy

718: W.D. Cao and R.L. Kennedy, Teledyne Allvac, Monroe, NC

8:50 am

Fatigue Crack Growth Mechanisms in Forged IN718:

C. Mercer, W.O. Soboyejo, Department of Materials Science and Engineering, The Ohio State University, Columbus, OH; K. Li, Edison Welding Institute, Columbus, OH

9:10 am

Fatigue and Corrosion Fatigue Properties of Alloys 625, 625 PLUS, 718, and 725:

E.J. Czyryca, Naval Surface Warfare Center, Bethesda, MD

9:30 am

Influence of Microstructure on Fatigue Properties of Alloy 718:

D. Gopikrishna, S.N. Jha, L.N. Dash, Superalloys Plant, Mishra Dhatu Nigam Limited, Hyderabad, India

9:50 am

Nondestructive Evaluation of High Temperature Low-Cycle Fatigue Damage Accumulation in Alloy 718 by Chemical Method:

Shin-Ichi Komazaki, Yutaka Watanabe, Tetsuo Shoji, Research Institute for Fracture Technology, Tohoku University, Sendai, Japan

10:10-10:30 am Coffee

10:30 am

Fatigue Damage Evaluation of Alloy 718 by Intra-Granular Distortion Analysis:

C. Fukuoka, H. Yoshizama, K. Morishima, S. Kihara, N. Ohi, H. Hattori, Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan

10:50 am

Oxidation Assisted Crack Propagation of Alloy 718:

R. Molins, J.C. Chassigne, E. Andrieu, ENSMP, Centre des Matériaux, Evry, France

11:10 am

Oxidation Mechanisms in Relation to High Temperature Crack Propagation Properties of Alloy 718 in H₂/H₂O/Inert Gas Environment:

P.F. Browning, M.F. Henry, General Electric Corporation, Schenectady, NY; K. Rajan, Rensselaer Polytechnic Institute, Troy, NY

11:30 am

SAGBO Mechanism on High Temperature Cracking Behavior of Alloy 718:

W. Carpenter, B. S-J. Kang and K-M. Chang, Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV

11:50 am

High Temperature Oxidation of a Modified Alloy 625:

E.J. Whitney, G. Simkovich, J. Fink, The Applied Research Laboratory, The Pennsylvania State University, State College, PA

WEDNESDAY, PM

Session VI: Weldability, P/M Technology and Environmental Effects

Session Chairman:

B.J. McTiernon, Crucible Materials and Prof. Xishan Xie, UST Beijing

1:15 pm

Effect of Multiple Heat Treatments on Weldability of Alloy 718:

J.W. Hooijmans, J.C. Lippold, The Ohio State University, Columbus, OH; W. Lin, Edison Welding Institute, Columbus, OH

1:35 pm

Effect of Delta Phase Precipitation on Repair Weldability of Alloy 718:

J.C. Lippold, Department of Industrial Welding, The Ohio State University, Columbus, OH; M.E. Mehl, Pratt & Whitney, W. Palm Beach, FL

2:00 pm

The Effect of B Segregation on Heat-Affected Zone Microfissuring in EB Welded Inconel 718:

M.C. Chaturvedi, W. Chen, A. Saranchuk, Department of Mechanical and Industrial Engineering, University of Manitoba, Winnipeg, Canada; N.L. Richards, Bristol Aerospace Ltd., Winnipeg, Manitoba

2:25 pm

Numerical Simulation of Inertia Welding of Inconel 718:

V. Balasubramanian, Y. Li, T. Stotler, J. Crompton, N. Katsube, W.O. Soboyejo, The Ohio State University, Columbus, OH

2:45-3:00 pm Coffee

3:00 pm

Sintering Effect on the Microstructure and Mechanical Properties of Alloy 718 Processed by Powder Injection Molding:

J.J. Valencia, J. Spirko, Concurrent Technologies, Johnstown, PA; R. Schmees, United Technologies, Pratt & Whitney, West Palm Beach, FL

3:25 pm

P/M Alloy 625M for High Strength Corrosion Resistant Applications:

F.J. Rizzo, Crucible Compaction Metals, Oakdale, PA; and S. Floreen, Lockheed-Martin, KAPL, Schenectady, NY

3:45 pm

Characterization of Current Production of AOD & ESR Alloy 625 Plate:

P. Ganesan, G.D. Smith, J.R. Crum, Inco Alloys International, Huntington, WV

Solidification Modeling of Vacuum Arc Remelted Superalloy 718 Ingot:

B.V. Subba Rao, D. Gopikrishna, S.N. Jha, Superalloys Plant, Mishra Dhatu Nigam Limited, India

Monte Carlo Simulation of Solidification:

Jinhua Gao, Raymond G. Thompson, Department of Materials and Mechanical Engineering, University of Alabama at Birmingham, AL

Grain Boundary Precipitates and Mechanical Properties of Alloy 718:

Osamu Matsumoto, Yasuhiko Yasumoto, Toshiya Moriyama, Tomohiro Tsuchiyama, Kobe Steel Ltd., Japan

Two-Step Forging of Alloy 718:

N.K. Park, J.T. Yeom, Y.S. Na, I.S. Kim, D.H. Kim, S.J. Choe, Dept. of Materials Eng., Korea Inst. of Machinery and Materials, Korea

High Temperature Deformation Behavior of Cast Alloy 718:

D. Zhao, S. Guillard, and A.T. Male, Concurrent Technologies Corporation, Johnstown, PA

Hot-Workability of IN706 Alloy:

Zhengdong Long, Peili Ma, Zengyong Zhong, Superalloy Department, Central Iron & Steel Research Institute, Beijing, China

Spray Formed Superalloy 625 Piping:

A.L. Moran, Department of Mechanical Engineering, United States Naval Academy; R.E. Rebis, Naval Surface Warfare Center, Annapolis, MD

Carbide Precipitation in Nickel Base Superalloys 718 and 625 and their Effect on Mechanical Properties:

M. Sundararaman, P. Mukhophyay, S. Banerjee, Metallurgy Division, Bhabha Atomic Research Centre, Bombay, India

Delta Phase and Deformation Fracture of IN718 Alloy:

Yun Zhang, Weicheng Yu, Xuebing Hueng, Yong Way, Zhuangqi Hu, Institute of Metal Research, Chinese Academy of Sciences, Schenyang, China

Metallographic Characterization of Pyromet 718 Alloy Fasteners:

George F. Vander Voort, Carpenter Technology Corporation, Reading, PA

Failure Analysis of an Alloy 718 Barrel Nut From an Army Attack Helicopter:

V.K. Champagne, G. Wechsler, M.S. Pepi, US Army Research Laboratory-Materials Directorate, Aberdeen Proving Ground, Aberdeen, MD; K. Bhansuli, U.S. Army Aviation Command, St. Louis, MO

Effect of Heat Treat Variations on the Hardness and Mechanical Properties of Wrought Inconel 718: John J. Schirra, Pratt and Whitney Aircraft, East Hartford, CT

Selected Properties of Anisotropic PWA1472:

D.P. DeLuca and T. Watkins, Pratt & Whitney, West Palm Beach, FL

Thermal Stability of Modified 718 Alloys Aged for 2000 Hours at 700°C:

Fengqin Xu, Encai Guo, Central Iron & Steel Research Institute, China; E.A. Loria, Consultant, Pittsburgh, PA; Peiguo Zhang, China Aviation Industries Co, China

Solid Particle Erosion Resistance and High Strain Rate Deformation Behavior of Inconel 625 Alloy:

B.F. Levin, J.N. DuPont, A.R. Marder, Leigh University, Bethlehem, PA; K.S. Vecchio, University of California at San Diego

Effect of Phosphorous on Fatigue Properties of Superalloy 718:

Weicheng Yu, Dezhong Lu, Shouren Guo, Jincui Yuan, Institute of Metal Research, Shenyang, China

Prestrain-Induced Diverse Creep Behavior of Superalloy 718:

S. Srinivas, M.C. Pandey, Defence Metallurgical Research Laboratory, India

Deformation Mechanisms and Fatigue Behavior of Prestrained Inconel 718 Superalloy:

Sreeramesh Kalluri, K. Bhanu Sankara Rao, Gary R. Halford, Michael A. McGraw, NASA Lewis Research Center, Cleveland, OH

Fatigue Resistance of Alloy 625 Sheet:

John F. Grubb, Allegheny Ludlum Corporation, Technical Center, Brackenridge, PA

The Fatigue Crack Growth Behaviors in Alloy 718 at High Temperature:

J.Z. Xie, Z.M. Shen, J.Y. Hou, Institute of Aeronautical Materials, Beijing, China

Creep Life Estimation of Service Exposed Inconel 625 Ammonia Cracker Tubes:

D. Mathew, K. Bhanu Sankara Rao, S.L. Mannan, Indira Gandhi Centre for Atomic Research, India; K. Paknikar, Heavy Water Board, Bombay, India; Raghurib Singh, National Metallurgical Laboratory, India

An Investigation of Microstructural Evolution of PM Alloy N625 During Interrupted Hot Isostatic Pressing (HIP) Cycles:

Brian A. Hann, Crucible Compaction Metals, Oakdale, PA; Ian Nettleship, S.A. Schmidt, Department of Materials Science & Engineering, University of Pittsburgh, Pittsburgh, PA

Hot Isostatic Pressing of SY625 Powder:

D. Lasalmonie, C. Dellis, R. Baccino, F. Moret, CEA/CEREM, Grenoble, France

Oxidation Characteristics and Thermal Expansion of IN718 at High Temperatures:

V. Suresh Babu, A.S. Pavlovic, M.S. Seehra, West Virginia University, Morgantown, WV

Effect of Thermomechanical Processing on the Properties of IN-706 Alloy:

A.J. Kahveci, A.K. Chakrabarti, K.P. Kinnear, Aluminum Company of America, Alcoa Center, PA; R. Beaumont, E.D. Seaton, G.W. Kuhlman, Alcoa Forging Division, Cleveland, OH

Symposium Schedule of Events

Sunday, June 15, 1997

Registration	Atrium	4:00PM-7:00PM
Welcoming Reception	Salons B&C	6:45PM-7:45PM
Introductory Overviews	Salons B&C	8:00PM-9:15PM

Monday, June 16, 1997

Registration	Atrium	7:00AM-5:00PM
Authors' Coffee	Pantry	7:00AM-8:00AM
Slide Preview Area	Suite (TBD)	7:00AM-4:30PM
Session I: Melting, Casting and Processing	Salons B&C	8:30AM-11:50AM
Luncheon	Pantry	12:00 Noon-1:00PM
Session II: Advances in Processing	Salons B&C	1:00PM-4:50PM
Interactive Session	Salons B&C	8:00PM-10:00PM

Tuesday, June 17, 1997

Registration	Atrium	7:00AM-5:00PM
Authors' Coffee	Pantry	7:00AM-8:00AM
Slide Preview Area	Suite (TBD)	7:00AM-4:30PM
Session III: Physical Metallurgy	Salons B&C	8:30AM-11:50AM
Luncheon	Pantry	12:00 Noon-1:00PM
Session IV: Mechanical Behavior	Salons B&C	1:15PM-5:00PM

Wednesday, June 18, 1997

Registration	Atrium	7:00AM-1:00PM
Authors' Coffee	Pantry	7:00AM-8:00AM
Slide Preview Area	Suite (TBD)	7:00AM-1:00PM
Session V: Creep, Fatigue and LongTime Properties	Salons B&C	8:30AM-11:50AM
Luncheon	Pantry	12:00 Noon-1:00PM
Session VI: Environmental Effects, Weldability and P/M Technology	Salons B&C	1:15PM-5:00PM
