

Table of Contents

PREFACE

| | |
|---|-----|
| Recent Developments in the Analysis of Creep Rupture Data | 1 |
| S.R. Holdsworth | |
| Recent Developments in Stress Relaxation Methodologies within Europe | 9 |
| P.R. McCarthy, D.G. Robertson, J. Orr and A. Strang | |
| Recent Results of Long-Term Creep Rupture Test | 17 |
| H. Irie, G.R. Booker and K. Yagi | |
| Experimental and Numerical Investigations on Creep Damage Evolution | 25 |
| A. Klenk, A. Kussmaul, K. Maile and P. Lenk | |
| Predicting the Creep Life and Failure Location of Weldments | 35 |
| J.M. Brear, A. Fairman, C.J. Middleton and L. Polding | |
| Characterization of Creep Fracture for Weld Fusion Line Cracks | 43 |
| K.B. Yoon and J.S. Lee | |
| The Influence of Material Mismatch of Weld on the Evaluation of Time-Dependent Fracture Mechanics Parameters | 51 |
| S.T. Tu, K.B. Yoon and J.M. Gong | |
| Rationalisation of the Multiaxial Stress Rupture Behaviour of Components | 61 |
| J.M. Church, J.M. Brear and D.R. Humphrey | |
| Secondary Creep in a Damage Tolerant Niobium Aluminide Intermetallic | 69 |
| R.P. Hayes and W.O. Soboyejo | |
| Comparison of the Creep and Fracture Behavior of Non-Hardened and Oxide Dispersion Hardened Platinum Base Alloys at Temperatures between 1200 °C and 1700 °C | 77 |
| R. Völkl, D. Freund, B. Fischer and D. Gohlke | |
| Creep and Creep Fatigue Crack Behavior of 1Cr- and 9Cr-Steels | 85 |
| K. Maile, A. Klenk, J. Granacher, G. Schellenberg and M. Tramer | |
| Creep Rupture Behavior of Advanced 9-12%Cr Steel Weldment | 99 |
| F. Masuyama, M. Matsui and N. Komai | |
| Creep Life Assessment of High Chromium Ferritic Steels by Recovery of Martensitic Lath Structure | 109 |
| K. Sawada, K. Maruyama, Y. Hasegawa and T. Muraki | |
| Creep Rupture Properties of Helium Implanted Low Activation Martensitic Steel for Nuclear Fusion Application | 115 |
| N. Yamamoto, J. Nagakawa and K. Shiba | |
| A Change in the Mechanism of Creep Crack Growth in a Dissimilar Metal Weld at 540 °C | 121 |
| B. Nath | |
| Mechanical Behavior and Strengthening Mechanism of W containing 9-12% Cr Steels under Creep Condition for a Cracked Specimen | 131 |
| A.T. Yokobori Jr., S. Takmori, T. Yokobori, Y. Hasegawa, K. Kubota and K. Hidaka | |
| Creep Crack Growth in a High Strength Low Alloy Steel at 360 °C | 139 |
| R. Wu, F. Seitisleam and R. Sandström | |
| Creep Crack Growth in Nearly Fully-Lamellar Gamma TiAl Alloys | 147 |
| K.V. Jata and Y.W. Park | |
| Modelling of High Temperature Multi-Axial Creep Rupture Behaviour of γ-Titanium Aluminide | 153 |
| R. Dempers, K.M. Nikbin and G.A. Webster | |
| Effect of Fiber Orientation on Fatigue and Fracture Properties of Fiber Eutectic Al-Al₃Ni Composite Alloy | 161 |
| S. Goto, S. Aso and Y. Komatsu | |
| On-Plant Test of TÜV HCM12 and ASME T23 Alloys for Use as Water Wall Materials | 169 |
| A. Karlsson, F. Rasmussen and M. Montgomery | |
| Evaluation of Long-Term Creep Rupture Strength of Tungsten-Strengthened Advanced 9-12%Cr Steels | 179 |
| F. Masuyama and N. Komai | |

| | |
|--|-----|
| Research of Welding Effect on Creep Damage of High Temperature Furnace Tubes | 189 |
| J.M. Gong, S.T. Tu and X. Ling | |
| The Reversibility of Creep Strain at Low Stresses and Low Temperatures | 197 |
| G.W. Greenwood and Y. Gencer | |
| The Significance of Diffusion Creep and Harper-Dorn Creep at Low Stresses | 205 |
| T.G. Langdon | |
| Deformation Behavior of Fe-3%Si Steel at High Temperatures | 213 |
| R. Kaibyshev and I. Kazakulov | |
| A Critical Reassessment of the Ravotnov-Kachanov Equations | 219 |
| A. Göcmen | |
| Lattice-Diffusion Creep Mechanism Not Based on Stress Heterogeneity | 231 |
| G. Itoh and A. Nojima | |
| A New Era of Grain Boundary Design and Control for High Temperature Materials | 237 |
| T. Watanabe | |
| Modelling the High Temperature Creep Behaviour of a New Single Crystal Nickel Base Superalloy | 245 |
| M. Maldini and V. Lupinc | |
| Orientation Dependent Creep Behavior and Dislocation Structure of Nickel Solid Solution Single Crystals | 253 |
| D. Siebörger and U. Glatzel | |
| Threshold Stress for High-Temperature Deformation of Dispersion-Strengthened Alloys with Incoherent Dispersoids | 261 |
| F. Yoshida and H. Nakashima | |
| High-Temperature Deformation of Cu-SiO₂ Bicrystals with [011] Twist Boundaries | 269 |
| H. Miura, K. Saijo and T. Sakai | |
| Kinetic Modelling of the Influence of Particles on Creep Strength | 277 |
| J. Eliasson, Å. Gustafson and R. Sandström | |
| Dislocation Activity in Plastically-Accommodated Creep in an Inclusion Bearing Material | 285 |
| E. Sato and K. Kurabayashi | |
| Lattice-Diffusion Creep Mechanism Not Based on Stress Heterogeneity (2) | 291 |
| G. Itoh and A. Nojima | |
| Effect of Dislocations Substructure on Creep Behavior of Steels Strengthened by Fine Carbides | 297 |
| N. Nishimura, M. Ozaki and F. Masuyama | |
| Study on Evaluation Procedure of Multiaxial Creep Strength of Low Alloy Steel | 305 |
| Y. Chuman, M. Yamauchi and T. Hiroe | |
| Theoretical and Experimental on the Significant Creep Deformation of SUS 316 Induced by Irradiation at 60°C | 313 |
| J. Nagakawa, Y. Murase, N. Yamamoto and T. Fukuzawa | |
| High Temperature Deformation with Interfacial and Plastic Accommodation in Spherical-Al₂O₃-Particle-Dispersed Al-Matrix-Composite | 321 |
| K. Kawabata, E. Sato and K. Kurabayashi | |
| The Size Effect of Particulate SiC on Activation Energy for High-Strain-Rate Superplastic Flow in Powder-Metallurgy Processed 2124 Al Composites | 329 |
| W.J. Kim and J.H. Yeon | |
| Experimental Study of the Mechanical Properties at Elevated Temperatures in Commercial Mg-Al-Zn Alloys for Superplastic Forming | 337 |
| T. Mukai, H. Tsutsui, H. Watanabe, I. Kunio, Y. Okanda, M. Kohzu, S. Tanabe and K. Higashi | |
| Superplasticity in GeO₂-Nd₂O₃ Doped Y-TZP | 343 |
| M. Nakano, K. Shimura, J. Mimurada, K. Sasaki, Y. Ikuhara and T. Sakuma | |
| Low Temperature Superplasticity in Fe₃Al Alloys | 349 |
| A.D. Shan and D.D. Lin | |
| Deformation Behavior of 7475 Aluminum Alloy at High Temperature | 355 |
| R. Kaibyshev, O. Situdikov, A. Goloborodko and T. Sakai | |
| Superplasticity at Low Temperatures in a ZK61 Magnesium Alloy Produced by Powder Metallurgy | 363 |
| H. Watanabe, T. Mukai, I. Kunio, Y. Okanda, M. Mabuchi and K. Higashi | |

| | |
|--|-----|
| High Strain Rate Superplasticity of a β-Si₃N₄ Whisker Reinforced Pure Aluminum Composite | |
| I. Tochigi, T. Imai, L. Geng and J. Mao | 369 |
| The Effect of Alumina Doping on the Superplastic Characteristics of 3 Y-TZP | |
| K. Sasaki, K. Shimura, J. Mimurada, Y. Ikuhara and T. Sakuma | 377 |
| Grain Boundary Analysis and Superplastic Characteristics in GeO₂-Doped TZP | |
| J. Mimurada, K. Sasaki, Y. Ikuhara and T. Sakuma | 383 |
| Characterization and Mechanical Properties of a δ/γ Duplex Stainless Steel | |
| J.A. Jiménez, M. Carsí, G. Frommeyer and O. Ruano | 389 |
| Contribution of Tungsten to Microstructure Stabilization and Improvement of Creep Resistance in Simple 9Cr-W Steels | |
| G.R. Booker | 395 |
| Effect of Heat Treatments on Room Temperature Creep Strain of a High Strength Steel | |
| C. Liu, Z. Zhao and D.O. Northwood | 403 |
| Strengthening of Heat Resistant Martensitic Steel by Cu Addition | |
| T. Tsuchiyama, Y. Futamura and S. Takaki | 411 |
| Creep Resistance and Structural Stability of Low-Alloy CrMo and CrMoV Steels | |
| J. Purmenský, V. Foldyna and Z. Kubon | 419 |
| Optimum Tungsten Content in High Strength 9 to 12% Chromium Containing Creep Resistant Steels | |
| Y. Hasegawa, T. Muraki, M. Ohgami and H. Mimura | 427 |
| Transient Creep Behaviour of Forged Thick Section 9Cr-1Mo Ferritic Steel | |
| B.K. Choudhary, C. Phaniraj, K. Bhanu Sankara Rao and S.L. Mannan | 437 |
| Effect of Soluble Nitrogen on the Creep Strength of an Austenitic 25Cr-20Ni Steel | |
| I. Park, F. Masuyama and T. Endo | 445 |
| Microstructural Aspects on the Creep Behaviour of Advanced Power Plant Steels | |
| H. Cerjak, P. Hofer and B. Schaffernak | 453 |
| Effect of M-C (M=Mo, Mn, and Cr) Atomic Pairs on Creep Properties of Fe-M-C Ternary Alloys | |
| A.K. Agarwal, H. Onodera, K. Kimura and H. Kushima | 461 |
| Acceleration of Fe₂W Precipitation and Its Effect on Creep Deformation Behavior of 8.5Cr-2W-VNb Steels with Si | |
| N. Fujitsuna, M. Igarashi and G.R. Booker | 469 |
| Strengthening Mechanisms in Heat-Resistant Martensitic 9Cr Steels | |
| K. Iwanaga, T. Tsuchiyama and S. Takaki | 477 |
| Heterogeneous Changes in Microstructure and Degradation Behaviour of 9Cr-1Mo-V-Nb Steel During Long Term Creep | |
| K. Kimura, H. Kushima and G.R. Booker | 483 |
| Creep Characteristics of Precipitation Hardened Carbon Free Martensitic Alloys | |
| S. Muneki, M. Igarashi and G.R. Booker | 491 |
| Creep Strengthening Mechanism of Mo and W in 9% Cr Heat Resistant Steels | |
| T. Muraki, Y. Hasegawa and M. Ohgami | 499 |
| Creep Properties of Advanced Heat-Resistant Martensitic Steels Strengthened by L1₀ Type Ordered Intermetallic Phase | |
| M. Igarashi, S. Muneki and G.R. Booker | 505 |
| Microstructural Evolution in SUS304H Steel during Long-Term Creep Over 10⁵ h | |
| M. Murata, H. Tanaka, G.R. Booker and H. Irie | 513 |
| Mechanical Properties of 11Cr-0.4Mo-2W-CuVNb Steel Welded Joints at Elevated Temperatures | |
| M. Tabuchi, T. Watanabe, K. Kubo, J. Kinugawa and G.R. Booker | 521 |
| Design of New Creep-Resistant Nickel-Base Superalloys for Power-Plant Applications | |
| F. Tancret, H.K.D.H. Bhadeshia and D.J.C. Mackay | 529 |
| Recovery of Creep Properties of Alloy 625 After Long Term Service | |
| M.D. Mathew, K. Bhanu Sankara Rao, S.L. Mannan, K. Paknikar and R. Singh | 537 |
| Extension of an Anisotropic Model of Creep in Single Crystal Superalloys to Variable Loading and Multiaxial Loading | |
| H. Basoalto, M.G. Ardakani, R.N. Ghosh, B.A. Shollock and M. McLean | 545 |

| | |
|--|-----|
| Creep in Single Crystals of γ Single Phase Ni-20Cr Alloy and Evolution of Dynamic Recrystallization | 553 |
| T. Matsuo, S. Takahashi, Y. Ishiwari and Y. Terada | |
| Influencing Factors of Stress Rupture at 750 °C Temperature for Cast Nickel Base Superalloy K403 | 561 |
| Y.J. Zheng and Y. Han | |
| Study on Creep Properties and Microstructural Relation in Directionally Solidified Nickel Base Superalloy | 569 |
| A. Nomoto, M. Yaguchi and T. Ogata | |
| Creep and Evolution of Dynamic Recrystallization in γ Single Phase Single Crystals Located at Poles in Standard Stereo-Triangle | 577 |
| H. Miyazawa, R. Takaku, D. Kawaguchi, Y. Terada and T. Matsuo | |
| Stress Dependence of Evolution of Dynamic Recrystallization in γ Single Phase Single Crystal | 585 |
| Y. Terada, Y. Ishiwari and T. Matsuo | |
| Creep of Reinforced and Unreinforced AZ91 Magnesium Alloy | 593 |
| V. Sklenička, M. Pahutová, K. Kuchařová, M. Svoboda and T.G. Langdon | |
| Creep Strength of Binary Magnesium Alloys up to 0.6 tTm | 601 |
| H. Sato, M. Suzuki, K. Maruyama and H. Oikawa | |
| Microstructural Evolution during Creep of the Mg-Al-Alloy AZ91hp | 609 |
| P. Zhang, B. Watzinger, Q.P. Kong and W. Blum | |
| Effect of Liquid Phase on Creep and Fracture Behavior of Al-5%Mg | 617 |
| H. Iwasaki, T. Mori, M. Mabuchi and K. Higashi | |
| High Temperature Strengths of Ir-Based Refractory Superalloys | 625 |
| Y. Yamabe-Mitarai, X. Yu, Y. Gu, Y. Ro, S. Nakazawa, T. Maruko and H. Harada | |
| Creep Behavior of Aluminum Alloy Foils for Microelectronic Circuits | 633 |
| Q. Zhou and G. Itoh | |
| Creep and Evolution of Dynamic Recrystallization in Single Crystals of Ti-48at%Al with Different Orientation between Stress Axis and γ Lamellar Plate | 639 |
| N. Shiratori, S. Hirata, T. Asai, M. Takeyama and T. Matsuo | |
| Anomalous Creep Curve of Cu-30 Mass%Zn Alloy | 647 |
| A. Muto, S. Goto and M. Tagami | |
| Deformation Mechanisms in Tin and Tin-Based Electronic Solder Alloys | 655 |
| M.D. Mathew, S. Movva and K.L. Murty | |
| Effect of Microalloying on the Creep Strength and Microstructure of Eutectic Sn-Pb Solders | 663 |
| N. Wade, T. Akuzawa, J. Kunii and K. Miyahara | |
| Microstructures and Fracture Behaviours of Ir-Nb Two-Phase Refractory Superalloys Containing Various Amounts of Nb, Ni, Mo, C and B | 669 |
| Y.F. Gu, Y. Yamabe-Mitarai, Y. Ro and H. Harada | |
| Investigation on Microstructure and Fracture of Quaternary Ir-Based Alloys | 677 |
| X.H. Yu, Y. Yamabe-Mitarai, Y. Ro and H. Harada | |
| Role of Interfacial Dislocations on Creep of a Fully Lamellar TiAl | 685 |
| T.G. Nieh and L.M. Hsiung | |
| Microstructural Evolution Associated with Creep Rate Minima in Pure- and Near-γ TiAl Intermetallics | 693 |
| A. Dlouhý, K. Kuchařová and T. Horkel | |
| A New Microstructural View of Creep in Near-γ TiAl-Alloys | 701 |
| B. Skrotzki | |
| Creep Deformation of Polysynthetically Twinned (PST) Ti-48mol%Al | 709 |
| G. Wegmann, T. Suda and K. Maruyama | |
| Effect of Lamellar Spacing on Creep Strength of Ti-42mol%Al Alloy with Fully Lamellar Structure | 717 |
| R. Yamamoto, K. Mizoguchi and K. Maruyama | |
| Alternative Approaches to Creep Data Analysis for Ceramic-Fibre-Reinforced Ceramic-Matrix Composites | 725 |
| B. Wilshire and F. Carreño | |
| Elasticity, Stress Relaxation and Creep in SiC Particle Reinforced Oxynitride Glass | 733 |
| T. Rouxel, J.-. Sanglebœuf, P. Verdier and Y. Laurent | |

| | |
|---|-----|
| Improvement of High Temperature Strength and Creep of α-Sialon by Grain Boundary Crystallization | |
| T. Nishimura, M. Mitomo, A. Ishida and H. Gu | 741 |
| Creep Processes in the Advanced Silicon Nitride Ceramics | |
| F. Lofaj, A. Okada, Y. Ikeda and H. Kawamoto | 747 |
| Creep Deformation and Fracture of SiC/SiC Composites | |
| S.L. Zhu, M. Mizuno, Y. Kagawa and Y. Ochi | 755 |
| Cavitation Failure in a Superplastic Alumina with Zirconia-Particle Dispersion | |
| K. Hiraga, Y. Sakka, T. Suzuki and K. Nakano | 763 |
| Tensile Deformation of Both ZrO_2/TiC Composite and Al_2O_3/TiC Composite at High Temperature | |
| H. Miyazaki, K. Kubobuchi, K. Yamaguchi, T. Iseki and T. Yano | 771 |
| Is there Diffusion Creep in Alumina? | |
| R.S. Kottada and A.H. Chokshi | 779 |
| High Temperature Mechanical Behavior of YSZ Nanocrystals | |
| F. Gutiérrez-Mora, M. Jiménez-Melendo, A. Domínguez-Rodríguez and R. Chaim | 787 |
| Yttrium in Polycrystalline α-Alumina | |
| M.A. Gülgün and M. Rühle | 793 |
| Slip Systems in Erbia Single Crystals | |
| A.A. Sharif, A. Misra, J.J. Petrovic and T.E. Mitchell | 801 |
| A Critical Factor to Determine the High-Temperature Creep Resistance in Cation-Doped Polycrystalline Al_2O_3 | |
| H. Yoshida, Y. Ikuhara and T. Sakuma | 809 |
| Compressive Creep and Stress Relaxation Kinetics in a High Purity Silicon Nitride Ceramics in the 1400-1650 °C Range | |
| S. Testu, J.L. Besson, T. Rouxel and G.B. Granger | 817 |
| Dislocation Structure and Activated Slip Systems in β-Silicon Nitride during High Temperature Deformation | |
| K. Kawahara, S. Tsurekawa and H. Nakashima | 825 |
| Transmission Electron Microscope Observation of Creep Deformed Al_2O_3, SiC and Si_3N_4 Ceramics | |
| T. Yano and A.T. Yokobori Jr. | 833 |
| Lifetime Prediction and Confirmation of Long Term Creep Resistance in Advanced Silicon Nitride Ceramics | |
| Y. Takigawa, J.-. Cao, Y. Ikeda and H. Kawamoto | 841 |
| Creep Behavior of a Fine-Grained Tetragonal Zirconia | |
| K. Morita, K. Hiraga and Y. Sakka | 847 |
| High-Temperature Deformation in Unidirectionally Solidified Eutectic Al_2O_3-YAG Single Crystal | |
| H. Yoshida, K. Shimura, S. Sugino, Y. Ikuhara, T. Sakuma, K. Nakagawa and Y. Waku | 855 |