

Contents

Overview	1
IRRADIATION CREEP AND CREEP RUPTURE	
Radiation-Induced Creep of Aluminum and Copper—SHAVKAT SH. IBRAGIMOV, EMIL S. AITKHOZHIN, AND YURI S. PYATILETOV	5
Cessation of Irradiation Creep in AISI 316 Concurrent with High Levels of Swelling—DOUGLAS L. PORTER AND FRANK A. GARNER	11
In-Reactor Creep Rupture Behavior of the D19 and 316 Alloys— RAYMOND J. PUIGH AND MARGARET L. HAMILTON	22
Analysis of the In-Reactor Creep and Rupture Life Behavior of Stabilized Austenitic Stainless Steels and the Nickel-Base Alloy Hastelloy-X—CHRISTO WASSILEW, KARL EHRLICH, AND HANS-JÜRGEN BERGMANN	30
In-Reactor Deformation of Zr-2.5 wt% Nb Pressure Tubes— ALLAN R. CAUSEY, VILIUS FIDLERIS, STUART R. MACEWEN, AND CHRIS SCHULTE	54
Light-Ion Irradiation Creep and Hardening of Model Ferritic Alloys—CHARLES H. HENAGER, JR. AND EDWARD P. SIMONEN	69
CHANGES IN MECHANICAL PROPERTIES OF ALLOYS	
The Ductile-to-Brittle Transition Behavior of Martensitic Steels Neutron Irradiated to 26 dpa—WAN-LIANG HU AND DAVID S. GELLES	83
Effects of Microstructure and Thermal Aging on Neutron Irradiation Embrittlement of 2½Cr-1Mo Steel for a Nuclear Pressure Vessel—MASAHIDE SUZUKI, KIYOSHI FUKAYA, TSUNEO KODAIRA, AND TATSUO OKU	98
Effects of 14-MeV Neutron Irradiations on Mechanical Properties of Ferritic Steels—AKIRA KOHYAMA, KYOICHI ASANO, AND NAOHIRO IGATA	111

Impurity Element Effects on the Toughness of 12 Cr-1 Mo Steel —SHANGSHIEN H. ROU, KAY J. HARRELSON, AND ROY C. WILCOX	123
Tensile Properties of Several 800 MeV Proton-Irradiated bcc Metals and Alloys —ROBERT D. BROWN, MONROE S. WECHSLER, AND CHRISTOPH TSCHALÄR	131
Post-Irradiation Fracture Properties of Precipitation-Strengthened Alloy D21 —FAN-HSIUNG HUANG	141
Mechanical Properties at Low and High Strain Rates of PE 16 Alloys Irradiated to 9.2 dpa —CARLO ALBERTINI, A. DEL GRANDE, M. MONTAGNANI, AND A. PACHERA	151
<i>J</i>-Integral Toughness of Low Fluence Neutron-Irradiated Stainless Steel DIN 1.4948 —MARTIN I. DE VRIES	162
Fatigue Crack Growth and Fracture Toughness Properties of Low Fluence Neutron-Irradiated Type 316 and Type 304 Stainless Steels —MARTIN I. DE VRIES	174
Experimental Assessments of Notch Ductility and Tensile Strength of Stainless Steel Weldments After 120°C Neutron Irradiation —J. RUSSELL HAWTHORNE, BLAINE H. MENKE, NABIL G. AWADALLA, AND KEVIN R. O'KULA	191
Effect of Cold Work on Tensile Behavior of Irradiated Type 316 Stainless Steel —R. L. KLUEH AND P. J. MAZIASZ	207
Radiation Effects on the Micromechanics of Fatigue Crack Initiation —TIMOTHY D. NAUGHTON, NASR M. GHONIEM, AND TUNG H. LIN	223
Hydrogen Buildup in Irradiated Type 304 Stainless Steel —ALVIN J. JACOBS	239
Mechanical Properties and Fracture Behavior of 20% Cold-Worked 316 Stainless Steel Irradiated to Very High Neutron Exposures —MARGARET L. HAMILTON, FAN-HSIANG HUANG, WALTER J. S. YANG, AND FRANK A. GARNER	245
The Effect of Neutron Irradiation on the Tensile Properties and Microstructure of Several Vanadium Alloys —DAVID N. BRASKI	271

Tensile and Fracture Properties of EBR-II-Irradiated V-15Cr-5Ti Containing Helium—MARTIN L. GROSSBECK AND JAMES A. HORAK	291
The Effects of Temperature and Strain Rate on the Properties of (Fe,Ni)₃V LRO Alloys—HUA T. LIN, ROY C. WILCOX, AND BRYAN A. CHIN	310
PRESSURE VESSEL STEELS	
Microstructural Characterization of Submerged Arc Weld Metals—KENNETH R. LAWLESS, WAYNE A. PAVINICH, AND ARTHUR L. LOWE, JR.	321
Comparison of Irradiation-Induced Transition Temperature Increases from Notch Ductility and Fracture Toughness Tests—ALLEN L. HISER	333
Comparison of the Effect of Power and Test Reactor Irradiations on the Fracture Properties of Submerged-Arc Welds—ARTHUR L. LOWE, JR. AND WAYNE A. PAVINICH	358
Investigation of Neutron Irradiated Reactor Pressure Vessel Steel by Positron Annihilation and Electron Microscopy—BALAKRISHNA SASTRY VISWANATHAN, DIETER PACHUR, AND RAJU V. NANDEDKAR	369
Tensile Properties of Irradiated Pressure Vessel Steels—GLENN E. LUCAS, G. ROBERT ODETTE, RANEN MAITI, AND J. WILLIAM SHECKHERD	379
Effects of Interstitial Impurities on Fracture Characteristics of A533-B Class 1 Pressure Vessel Steel—YOUN H. JUNG AND K. LINGA MURTY	395
Irradiation Embrittlement of Advanced Pressure Vessel Steels—K. S. SIVARAMAKRISHNAN, SUBRATA CHATTERJEE, S. ANANTHARAMAN, U. K. VISWANATHAN, K. S. BALAKRISHNAN, AND PRADIP R. ROY	408
A Comparison Between French Surveillance Program Results and Predictions of Irradiation Embrittlement—CHRISTIAN BRILLAUD, F. HEDIN, AND B. HOUSSIN	420
The Effect of Thermal Annealing on the Fracture Properties of a Submerged-Arc Weld Metal—WAYNE A. PAVINICH AND ARTHUR L. LOWE, JR.	448

Steel Impurity Element Effects on Postirradiation Properties Recovery by Annealing—J. RUSSELL HAWTHORNE	461
A Study of Radiation Induced Voids and Precipitates and Their Annealing Behavior By Small-Angle Neutron Scattering—ISANG E. UKPONG, AARON D. KRAWITZ, DAVID F. R. MILDNER, AND H. P. LEIGHLY, JR.	480
Irradiation Embrittlement Evaluation Without Lateral Expansion Measurements—SUBRATA CHATTERJEE, S. ANANTHARAMAN, K. S. SIVARAMAKRISHNAN, AND PRADIP R. ROY	494
Trend Curve Data Development and Testing—WILLIAM N. McELROY, RAYMOND GOLD, ROBERT L. SIMONS, AND J. H. ROBERTS	505
Damage Rate and Spectrum Effects in Ferritic Steel ΔNDTT Data—ROBERT L. SIMONS	535
Current Limitations of Trend Curve Analysis for the Prediction of Reactor PV Embrittlement—RAYMOND GOLD AND WILLIAM N. McELROY	552
A Statistical Analysis of Fracture Toughness of Irradiated Low-Alloy Steel Plate and Welds—JOHN J. McGOWAN AND RANDY K. NANSTAD	569
RADIATION DAMAGE IN NONMETALS	
Fission Fragment Damage in Ceramic Nuclear Fuels—HISAYUKI MATSUI, MIKIO HORIKI, MASAYOSHI TAMAKI, AND TOMOO KIRIHARA	593
Fission Fragment Induced Hardening in Uranium Mononitride—MASAYOSHI TAMAKI, HISAYUKI MATSUI, AND TOMOO KIRIHARA	602
The Assessment of Seal Performance and Lifetime Prediction in a Nuclear Environment—SUZANNA G. BURNAY AND JAMES W. HITCHON	609
The Effects of Radiation on Organic Matrix Waste Forms—D. CLIVE PHILLIPS, DIANA I. JOHNSON, SUZANNA G. BURNAY, AND JAMES W. HITCHON	615

Hydrogen Control in the Handling, Shipping, and Storage of Wet Radioactive Waste—JAMES O. HENRIE AND DANN J. FLESHER	636
Photobleaching Effects on Radiation-Induced Loss for Silica Glass Image Fiber—SYOTARO HAYASHI, YUKIO WADA, YOSHIKI CHIGUSA, KUNIO FUJIWARA, YASUJI HATTORI, AND YASUO MATSUDA	647
Irradiation Devices for Reactor Materials: Results Obtained from Irradiated Lithium Aluminate at the OSIRIS Reactor—FRANCIS LEFEVRE, GILLES THEVENOT, BERNARD RASNEUR, AND FERNANDE BOTTER	654
Irradiation Effects in KAPTON Polyimide Film from 14-MeV Neutrons and Cobalt-60 Gamma Rays—KATSUNORI ABE, CLINTON M. LOGAN, KEIJI SANEYOSHI, AND FRANK W. CLINARD, JR.	669
Changes in Surface Morphology and Microcrack Initiation in Polymers Under Simultaneous Exposure to Stress and Fast Atom Bombardment—RAJENDRAN S. MICHAEL, STEVE FRANK, DUSAN STULIK, AND J. THOMAS DICKINSON	682
Effect of Gamma Radiation on the Permeability of Ophthalmic Preservatives Through Fluorine Surface-Treated Low-Density Polyethylene Bottles—DORINDA A. SPARACIO AND MARY A. AMINI	688
IRRADIATION FACILITIES	
The Low-Temperature Neutron Irradiation Facility at ORNL—H. R. KERCHNER, R. R. COLTMAN, JR., C. E. KLABUNDE, AND F. W. YOUNG, JR.	701
Irradiation Facilities at the Idaho National Engineering Laboratory—VIRENDRA P. GUPTA, JAMES S. HERRING, ROBERT E. KORENKE, AND YALE D. HARKER	705
Operating Experience at the Los Alamos Spallation Radiation Effects Facility at LAMPF—WALTER F. SOMMER, WOLFGANG LOHMANN, KARL GRAF, IVAN K. TAYLOR, AND RAYMOND M. CHAVEZ	718

Additional Measurements of the Radiation Environment at the Los Alamos Spallation Radiation Effects Facility at LAMPF—DOROTHY R. DAVIDSON, ROBERT C. REEDY, LAWRENCE R. GREENWOOD, WALTER F. SOMMER, AND MONROE S. WECHSLER	730
DOSIMETRY OF RADIATION ENVIRONMENTS	
Recent Research in Neutron Dosimetry and Damage Analysis for Materials Irradiations—LAWRENCE R. GREENWOOD	743
Improvement of Accuracy Assessment in Radiation Damage Predictions—WILLEM L. ZIJP, ÉVA M. ZSOLNAY, AND HENK J. NOLTHENIUS	750
Comparison of Calculated Integral Values Using Measured and Calculated Neutron Spectra for Fusion Neutronics Analyses—HIROSHI SEKIMOTO	761
Measurements of $^{10}\text{B}(n,\text{He})$ Reaction Rates in a Mockup Control Rod in ZPPR—STEPHEN B. BRUMBACH, PETER J. COLLINS, AND BRIAN M. OLIVER	769
Spectrum Integrated (n,He) Cross Section Comparison and Least Squares Analysis for ^6Li and ^{10}B in Benchmark Fields—ROBERT E. SCHENTER, B. M. OLIVER, AND HARRY FARRAR, IV	781
Index	789