

CONTENTS

PREFACE	xix
EDITORIAL	xxi
BEST PAPER AWARDS	xxiii
1997 INTERNATIONAL CRYOGENICS MATERIALS CONFERENCE BOARD OF DIRECTORS	xxv

A—STRUCTURAL AND CRYOCOOLERMATERIALS

Nickel-Base Alloys: Mechanical & Physical Properties

EFFECTS OF AN 8 TESLA MAGNETIC FIELD ON MECHANICAL PROPERTIES OF INCOLOY 908 ALLOY AT 4 K	1
T. Kadota, T. Tanaka, Y. Kohno, H. Nakajima, H. Tsuji, and K. Shibata	
AVOIDANCE METHOD STUDY FOR SAGBO CRACKING DURING HEAT TREATMENT OF A ITER CS MODEL COIL CONDUCTOR USING INCOLOY 908 JACKET	9
T. Kato, K. Hamada, K. Yamamoto, I. Watanabe, K. Ishio, T. Ando, H. Tsuji, T. Abe, K. Kikuchi, N. Minakawa, M. Tsuchiya, M. Tsubota, Y. Katayama, S. Ikeda, H. Ogata, T. Fujioka, and A. Osaki	
MECHANICAL INVESTIGATIONS ON AGED STAINLESS STEEL AND INCOLOY 908 MATERIALS AT 4.2 K AND 7 K	17
A. Nyilas, B. Obst, and D. R. Harries	
LOW-TEMPERATURE TENSILE PROPERTIES OF Fe-Ni ALLOYS	25
R. P. Reed	
NEW FAILURE PREDICTION MODEL FOR A Ni-Fe SUPERALLOY SHEATH OF SUPERCONDUCTING FUSION MAGNETS	33
J. H. Kim, I. S. Hwang, and R. L. Tobler	
A STUDY OF FRACTURE TOUGHNESS AND MICROSTRUCTURES IN THE WELD HEAT-AFFECTED ZONE OF QLT-PROCESSED 9% Ni STEEL	41
J. Jang, Y. Yang, W. Kim, and D. Kwon	

FATIGUE LIFE ESTIMATION OF ITER CONDUITS AT 4 K	49
J. Feng	
FRACTURE TOUGHNESS AND TENSILE BEHAVIOR OF INCOLOY 908	57
E.-H. Han, R. J. Hughes, H. Au, R. G. Ballinger, D. Grundy, and P. Stahle	
Austenitic Alloys & Steels: Mechanical & Physical Properties	
SELECTION OF TOKAMAK TOROIDAL FIELD COIL CASE STRUCTURAL MATERIALS	65
F. M.G. Wong and N. A. Mitchell	
TRIAL FABRICATION OF HEAVY SECTION BASE METALS AND WELDED JOINTS FOR ITER TF COIL	73
K. Ishio, H. Nakajima, Y. Nunoya, Y. Miura, T. Kawasaki, and H. Tsuji	
FATIGUE CRACK GROWTH RATE OF SUS 316 AND WELD JOINT WITH NATURAL CRACK AT 7 K	81
A. Nishimura, J. Yamamoto, and A. Nyilas	
WELDING CONSUMABLE DEVELOPMENT FOR A CRYOGENIC (4 K) APPLICATION	89
S. F. Kane, T. A. Siewert, C. N. McCowan, and A. L. Farland	
NONEQUILIBRIUM SEGREGATION AND FRACTURE MECHANISM OF HIGH-MANGANESE CRYOGENIC STEELS	97
K. S. Xue, D. Y. Sun, Z. R. Xu, B. Wang, J. Li, J. Q. Shen, and W. Wang	
TECHNIQUES FOR AUTOMATIC AUTOGENOUS WELDING OF LOW SULFUR 316LN BEAM TUBE	105
S. F. Kane and A. L. Farland	
NONEQUILIBRIUM SEGREGATION OF MANGANESE IN HIGH-MANGANESE CRYOGENIC STEELS	113
D. Y. Sun, K. S. Xue, Z. R. Xu, B. Wang, J. J. Zhang, J. F. Yi, and W. Wang	
A STUDY OF MECHANICAL PROPERTIES AND WELDABILITY IN WELDMENT OF COLD-ROLLED Fe-19Mn-5.5Cr-3.5Al-0.25C ALLOY AT CRYOGENIC TEMPERATURE	121
Y. P. Kim, W. S. Kim, and S. H. Hong	
STRENGTH, DUCTILITY/TOUGHNESS AND FINE-BLANKING OF NONMAGNETIC HIGH Mn STEEL AND ITS ACCELERATOR SUPERCONDUCTING MAGNETS APPLICATION	129
K. Nohara, U. Nishiike, K. Kobayashi, and T. Akita	
EFFECTS OF STRESS LEVEL IN PRE-CRACKING ON FRACTURE TOUGHNESS OF SUS 304L STEEL IN AN 8 TESLA MAGNETIC FIELD AT 4 K	137
T. Tanaka, T. Kadota, Y. Kohno, and K. Shibata	
FRACTURE TOUGHNESS EVALUATION OF A ROUND BAR WITH A CIRCUMFERENTIAL NOTCH AT CRYOGENIC TEMPERATURE	145
A. Nishimura, J. Yamamoto, and A. Nyilas	

FRACTURE MECHANICS INVESTIGATIONS AT 7 K OF STRUCTURAL MATERIALS WITH EDM NOTCHED ROUND AND DOUBLE EDGED-BARS A. Nyilas, B. Obst, and A. Nishimura	153
DETERMINING THE AMOUNT OF ϵ -MARTENSITE DURING LOW-TEMPERATURE DEFORMATION BY A RESISTOMETRIC TECHNIQUE M. M. Chernick and L. V. Skibina	161
Insulation Materials & Coatings: Development, Properties, & Testing	
CRYOMECHANICS AND DOUBLE-NOTCH INTERLAMINAR SHEAR STRENGTH OF G-10 Cr GLASS-CLOTH/EPOXY LAMINATES Y. Shindo, R. Wang, K. Horiguchi, and S. Ueda	167
DEVELOPMENT OF U.S./ITER CS MODEL COIL TURN INSULATION R. P. Reed, P. E. Fabian, and J. B. Schutz	175
EFFECT OF APPLIED STRESS DURING IRRADIATION AT 5 K ON THE SHEAR/COMPRESSION STRENGTH OF BONDED SPECIMENS D. Evans and R. P. Reed	183
THE INTERLAMINAR SHEAR STRENGTH OF FRPs UNDER THE INFLUENCE OF VARIOUS RADIATION SOURCES S. M. Spiessberger, K. Humer, H. W. Weber, E. K. Tschegg, H. Gerstenberg, and A. Udagawa	191
LOW TEMPERATURE TENSILE AND SHEAR/TENSION PROPERTIES OF COMPOSITE MATERIALS WITH ELECTRICALLY INSULATING BARRIER FILMS D. E. Baynham, D. Evans, S. J. Gamage, D. Morrow, and S. J. Robertson	197
TESTS OF FILL FIBERS AND EPOXY RESINS FOR THE FABRICATION OF IMPREGNATED SUPERCONDUCTING SOLENOIDS M. A. Green, S. K. Mukherjee, S. M. Dardin, J. W. O'Neill, R. E. Marrs, and E. Magee	205
PLASMA TREATMENT OF COMPOSITE INTERFACE FOR CRYOGENIC USE . . . T. Yagi, S. Ueno, S. Nishijima, and T. Okada	211
AEROGEL-BASED CRYOGENIC SUPERINSULATION J. E. Fesmire, S. Rouanet, and J. Ryu	219
MECHANICAL PROPERTIES OF ZIRCONIA AND SILICA AT CRYOGENIC TEMPERATURE S. Ueno, S. Nishijima, A. Nakahira, K. Kijima, H. Ejima, and T. Okada	227
INSULATION FOR WIND AND REACT HIGH TEMPERATURE SUPERCONDUCTING COILS I. H. Mutlu and Y. S. Hascicek	233
A COMPOSITE ELECTRICAL INSULATION IN SUPERCONDUCTING MAGNETS A. Yamamoto, T. Ueki, H. Mukai, S. Hosaka, Y. Toda, Y. Makida, S. Mine, and K. Makishima	239

Polymers, Composites, & Epoxies

FREE VOLUME AND CRYOGENIC PROPERTIES OF HYBRID MATERIALS . . .	245
T. Okada, S. Nishijima, S. Ueno, Y. Honda, K. Niihara, A. Nakahira, and K. Kijima	
PROPERTIES OF MATERIALS FOR USE IN LIQUID HYDROGEN CONTAINMENT VESSELS	253
S. J. Canfer and D. Evans	
FAILURE CRITERION OF GLASS/EPOXY COMPOSITES USED AS ELECTRICAL INSULATION FOR LARGE SUPERCONDUCTING MAGNETS	261
J. M. Rey, F. Rondeaux, B. Gallet, A. Desirelli, and F. Kircher	
VAMAS ROUND ROBIN TESTS ON COMPOSITE MATERIAL AND SOLDER AT LIQUID HELIUM TEMPERATURE	269
T. Ogata, D. Evans, and A. Nyilas	
TOUGHENING OF EPOXY RESIN SYSTEMS FOR CRYOGENIC USE	277
T. Ueki, K. Nojima, K. Asano, S. Nishijima, and T. Okada	
MOLECULAR DYNAMIC SIMULATION OF POLYMERIC MATERIALS AT CRYOGENIC TEMPERATURE	285
S. Nishijima, T. Nishiura, and T. Okada	
ENHANCED CREEP OF EPOXY RESIN DURING IRRADIATION AT CRYOGENIC TEMPERATURES	291
T. Nishiura, S. Nishijima, S. Ueno, Y. Tsukasaki, and T. Okada	

Aluminum & Copper Alloys: Properties & Processing

POP-IN PHENOMENA IN Al-Li ALLOY	299
A. Bussiba, H. Alush, and M. Kupiec	
OPTIMIZATION STUDIES ON HIGH-STRENGTH Ag-Cu CONDUCTORS	307
F. Heringhaus, S. O. Prestemon, G. Gottstein, and H.-J. Schneider-Muntau	
FATIGUE-INDUCED ELECTRICAL DEGRADATION OF COMPOSITE HIGH- PURITY/HIGH-STRENGTH ALUMINUM RINGS AT 4 K	315
S. L. Bray, J. W. Ekin, and M. J. Nilles	
LOW-TEMPERATURE PLASTIC DEFORMATION AND RESISTIVITY OF COARSE-GRAIN PURE ALUMINUM	323
S. E. Demyanov, M. L. Petrovskii, A. V. Petrov, and S. P. Zakatov	
TIME-RESOLVED FLOW STRESS BEHAVIOR OF STRUCTURAL MATERIALS AT LOW TEMPERATURES	331
B. Obst and A. Nyilas	

Thermal & Mechanical Properties

- PROBLEMS INVOLVED IN DETERMINING THE MECHANICAL
PROPERTIES OF SOLID NITROGEN AND A COMPOSITE OF SOLID
NITROGEN AND ALUMINUM FOAM (40 K–61 K) 339
R. C. Pederson, C. D. Miller, J. M. Arvidson, K. Blount, and M. P. Schulze
- SIMPLE GUARDED HOT PLATE TECHNIQUE FOR MAKING THERMAL
CONDUCTIVITY MEASUREMENTS OF COMPOSITE MATERIALS AT
CRYOGENIC TEMPERATURES 349
R. J. Oram and E. G. Wolff
- THERMAL CONTRACTION COEFFICIENT MEASUREMENT TECHNIQUE
OF SEVERAL MATERIALS AT LOW TEMPERATURES USING
ELECTRONIC SPECKLE PATTERN INTERFEROMETRY 359
S. Nakahara, S. Nishida, S. Hisada, and T. Fujita
- THERMAL CONDUCTIVITY OF SINTERED NICKEL FILMS OBTAINED
WITH THE HVOF TECHNIQUE 367
F. Pavese, D. Ferri, D. Giraudi, and M. Vanolo
- LOW-TEMPERATURE THERMAL, DIELECTRIC, AND ACOUSTIC
PROPERTIES OF AMORPHOUS POLYMERS 373
M. Jäckel, F. V. Schoenebeck, T. Eggert, G. Köbernik, U. Escher, B. Kluge,
and A. Gladun