## Contents

Preface	ix
Introduction	хi
PROCESSING	
The Effects of Heating Rate on Magnesia Doped Alumina Prepared by SPS  B. Apak, G. Goller, F. C. Sahin, and O. Yucel	3
Effect of Coke Calcination Temperature on the Processing of Reaction Bonded Silicon Carbide Rodrigo P. Silva, Claudio V. Rocha, Marysilvia F. Costa, and Celio A. Costa	9
Pressureless Sintering of Mullite-Ceria-Doped Zirconia-Silicon Carbide Composites Barry A. Bender, Michael Vick, and Ming-Jen Pan	15
The Role of Carbon in Processing Hot Pressed Aluminium Nitride Doped Silicon Carbide N. Ur-rehman, P. Brown, and L. J. Vandeperre	27
CHARACTERIZATION	
Microstructure and High-Temperature Properties of Si-B-C-N MA-Powders and Ceramic Yu Zhou, Zhi-Hua Yang, De-Chang Jia, and Xiao-Ming Duan	37
Influence of Water Quality on Corrosion of Multi-Oxide Engineering Ceramics Marju Mannila and Antti Häkkinen	51

Composites	58
J. Wang, F. Giuliani, and L. J. Vandeperre	
Nano-Indentation Hardness Measurements as a Characterization Technique of SiC and Pyrolytic Carbon Layers of Experimental PBMR Coated Particles	69
I. J. van Rooyen, E. Nquma, J. Mahlangu, and J. H. Neethling	
High Temperature Mechanical Loss of Nanostructured Yttria Stabilized Zirconia (3Y-TZP) Reinforced with Carbon Nanotubes Mehdi Mazaheri, Daniele Mari, Robert Schaller, and Zhijian Shen	79
The Influence of Nanosize Carbon Concentration on Mechanical Properties of RBSIC	87
Cristiane Evelise Ribeiro da Silva, Rosa Trejo, Sanghoon Shim, Edgar Lara-Curzio, and Celio A. Costa	
Si/SiC and Diamond Composites: Microstructure-Mechanical Properties Correlation S. Salamone, R. Neill, and M. Aghajanian	97
Mechanical Properties and Failure Criterion of Silicon-Based Joints	107
L. M. Nguyen, O. Gillia, Emmanuelle Rivière, and Dominique Leguillon	
Effect of Various SnAgTi-Alloys and Laser Induced Texturing on the Shear Strength of Laser Brazed SiC-Steel-Joints  I. Südmeyer, M. Rohde, T. Fürst	119
Characterization of Poled Single-Layer PZT for Piezo Stack in Fuel Injection System Hong Wang, Tadashi Matsunaga, and Hua-Tay Lin	127
Thermal Tomographic Imaging for Nondestructive Evaluation of Ceramic Composite Materials J. G. Sun	137
A More Comprehensive NDE: PCRT for Ceramic Components Leanne Jauriqui and Lem Hunter	145
FIBER REINFORCED COMPOSITES	
Microstructure and Thermodynamic Descriptions of SiC-Based Ceramic Fibers Géraldine Puyoo, Georges Chollon, René Pailler, and Francis Teyssandier	159
Static Fatigue of Multifilament Tows at High Temperatures above 900°C A. Laforêt and J. Lamon	173

3D Multiscale Modeling of the Mechanical Behavior of Woven Composite Materials G. Couégnat, E. Martin, and J. Lamon	185
Mode I Interlaminar Fracture Toughness Testing of a Ceramic Matrix Composite G. Ojard, T. Barnett, M. Dahlen, U. Santhosh, J. Ahmad, and R. Miller	195
Comparative Study of Tensile Properties of Uni-Directional Single-Tow SiC-Matrix Composites Reinforced with Various Near-Stoichiometric SiC Fibers Kazumi Ozawa, Yutai Katoh, Edgar Lara-Curzio, Lance L. Snead, and Takashi Nozawa	207
Foreign Object Damage in an N720/Alumina Oxide/Oxide Ceramic Matrix Composite Sung R. Choi, David C. Faucett, and Donald J. Alexander	221
Static Contact Damage in an N720/Alumina Oxide/Oxide Ceramic Matrix Composite with Reference to Foreign Object Damage David C. Faucett, Donald J. Alexander, Sung R. Choi	233
Effects of Environment on Creep Behavior of NEXTEL™720/ Alumina-Mullite Ceramic Composite with ±45° Fiber Orientation at 1200°C M. Ozer and M. B. Ruggles-Wrenn	245
Fatigue Behavior of an Oxide/Oxide CMC under Combustion Environment Shankar Mall and Andrew R. Nye	261
EROSION AND WEAR	
Particle Erosion Wear Behavior of New Conceptual SiC/SiC Composites Min-Soo Suh, Tatsuya Hinoki, and Akira Kohyama	275
Threshold of Ring Crack Initiation on CVD-SiC under Particle	285
Impact Min-Soo Suh, Sang-Yeob Oh, Tatsuya Hinoki, Chang-Min Suh, and Akira Kohyama	
Advanced Ceramic-Steel Pairings under Permanent Slip for Dry Running Clutch Systems Albert Albers and Michael Meid	295
Development and Validation of Lubricated Multi-Disk Clutch Systems with Advanced Ceramics Albert Albers, Johannes Bernhardt, and Sascha Ott	309

## **MODELING**

Virtual Testing and Simulation of Multiple Cracking in Transverse Tows of Woven CMCs Pierre Pineau, Guillaume Couégnat, and Jacques Lamon	319
Isothermal Chemical Vapor Infiltration Modeling by Random Walks in CMT 3D Images at Two Scales G. L. Vignoles, I. Szelengowicz, W. Ros, C. Mulat, and C. Germain	329
Adsorption and Surface Diffusion of Oxygen on 3C and 2H-SiC Polytypes: Numerical Studies Junjie Wang, Litong Zhang, Qinfeng Zeng, and G. L. Vignoles	341
Effective Surface Recession Laws for the Physico-Chemical Ablation of C/C Composite Materials G. L. Vignoles, J. Lachaud, Y. Aspa, and M. Quintard	351
Model of the Influence of Damage on the Thermal Properties of Ceramic Matrix Composites Jalal El Yagoubi, Jacques Lamon, and Jean-Christophe Batsale	361
Author Index	373