## Contents

Preface	ix
MICROWAVE PROCESSING	
Continuous Microwave-Driven Polyol Process for Synthesizing Ytterbium-Doped Yttria Powder M. A. Imam, A. W. Fliflet, K. L. Siebach, A. David, R. W. Bruce, S. B. Qadri, C. R. Feng and S. H. Gold	3
Microwave Irradiation-Assisted Method for the Rapid Synthesis of Fine Particles of α-Al <sub>2</sub> O <sub>3</sub> and α-(Al <sub>1-x</sub> Cr <sub>x</sub> ) <sub>2</sub> O <sub>3</sub> and Their Coatings on Si(100) Anshita Gairola, A. M. Umarji, and S. A. Shivashankar	15
CHEMICAL VAPOR DEPOSITION	
Synthesis and Characterization of Si/Si <sub>2</sub> N <sub>2</sub> O/Si <sub>3</sub> N <sub>4</sub> Composites from Solid-Gas Precursor System Via CVD J. C. Flores-García, A. L. Leal-Cruz, and M. I. Pech-Canul	25
Effect of Flow Rate, Nitrogen Precursor and Diluent on Si <sub>2</sub> N <sub>2</sub> O Deposition by HYSYCVD A. L. Leal-Cruz, M. I. Pech-Canul, E. Lara-Curzio, R. M. Trejo, and R. Peascoe	35
COMBUSTION SYNTHESIS	
MgAl <sub>2</sub> O <sub>4</sub> /SiC Composite Ceramic Material Produced by Combustion Synthesis Podbolotov Kirill Borisovich and Diatlova Evgenija Mihajlovna	45

. **v** 

Finite Element Analysis of Self-Propagating High-Temperature Synthesis of Strontium-Doped Lanthanum Manganate Sidney Lin and Jiri Selig	53
REACTION FORMING AND POLYMER PROCESSING	
Comparison of Bulk and Nanoscale Properties of Polymer Precursor Derived Silicon Carbide with Sintered Silicon Carbide Arif Rahman, Suraj C. Zunjarra, and R. P. Singh	65
Process Design and Production of Boron Trichloride from Native Boron Carbide in Lab-Scale D. Agaogullari and I. Duman	77
SINTERING AND HOT PRESSING	
Spark Plasma Sintered Alumina-Zirconia Nano-Composites by Addition of Hydroxyapatite S. F. Li, H. Izui, M. Okano, W. H. Zhang, and T. Watanabe	93
Comparison of Slip Cast to Hot Pressed Boron Carbide T. Sano, E.S.C. Chin, B. Paliwal, and M. W. Chen	107
AMORPHOUS CERAMICS	
Mechanically Driven Amorphization and Bulk Nanocrystalline Synthesis of Ultra-High Temperature Ceramics H. Kimura	119
Preparation and Characterization of Fused Silica Based Ceramic Cores Used in Superalloy Casting M. Arin, S. Sevik, and A. B. Kayihan	131
COATINGS AND FILMS	
Photon Effects in Ultra-Thin Oxide Films: Synthesis and Functional Properties S. Ramanathan, M. Tsuchiya, C. L. Chang, and C. Ko	143
Faradayic Process for Electrophoretic Deposition of Thermal Barrier Coatings for Use in Gas Turbine Engines Joseph Kell and Heather McCrabb	153
A Novel Method to Spray Tungsten Carbide Using Low Pressure	161

Cold Spray Technology J. Wang and J. Villafuerte

## COMPOSITES

Foreign Object Damage Versus Static Indentation Damage in an Oxide/Oxide Ceramic Matrix Composite Sung R. Choi, Donald J. Alexander, and David C. Faucett	171
Distinguished Functions Making the Best Use of the Unique Composite Structures Toshihiro Ishikawa	181
Effects of Environment on Creep Behavior of NEXTEL <sup>™</sup> 720/ Alumina-Mullite Ceramic Composite at 1200 °C C. L. Genelin and M. B. Ruggles-Wrenn	193
Performance of Composite Materials in Corrosive Conditions: Evaluation of Adhesion Loss in Polymers Via Cathodic Disbondment and a Newly Developed NDE Technique Davion Hill, Colin Scott, Ayca Ertekin, and Narasi Sridhar	205
Effect of Variations in Process Shear on the Mixedness of an Alumina–Titania System C. August, M. Jitianu, and R. Haber	215
MODELING	
Modeling of the Pressure in 1-D Green Ceramic Bodies during Depressurization from Conditions of Supercritical Extraction of Binder Kumar Krishnamurthy and Stephen J. Lombardo	229
Models of the Strength of Green Ceramic Bodies as a Function of Binder Content and Temperature Stephen J. Lombardo and Rajiv Sachanandani	239
Finite Element Modeling of Steel Wire Drawing through Dies Based on Encapsulated Hard Particles Daniel J. Cunningham, Erik M. Byrne, Ivi Smid, John M. Keane	249
Author Index	255

٢