

# Contents

Preface	ix
<b>ENGINEERING CERAMICS AND CERAMIC MATRIX COMPOSITES: DESIGN, DEVELOPMENT, AND APPLICATIONS</b>	
Design and Testing of a C/C-SiC Nozzle Extension Manufactured Via Filament Winding Technique and Liquid Silicon Infiltration Fabian Breede, Raouf Jemmali, Heinz Voggenreiter, and Dietmar Koch	3
Preparation of Zirconium Phosphate Bonded Silicon Nitride Porous Ceramics Reinforced by In-Situ Reacted Silicon Nitride Nanowires Fei Chen, Feiyu Li, Kaiyu Wang, Qiang Shen, and Lianmeng Zhang	15
Residual Strains in Structural Stone: A Degradation Mechanism Victoria Shushakova, Edwin R. Fuller, Jr., Florian Heidelbach, and Siegfried Siegesmund	25
Joining of SiC/SiC Ceramic Matrix Composites Using REABOND Technology Michael C. Halbig, Mrityunjay Singh, and Craig E. Smith	39
Fracture Criterion of Short Carbon Fiber-Dispersed SiC Matrix Composite under Mixed Mode Loading Condition Ryo Inoue, Hideki Kakisawa, and Yutaka Kagawa	53
Ceramic Matrix Composites Manufactured by Multistep Densification of Si-O-C Fiber Preform L. Maillé, M. A. Dourges, S. Le Ber, and R. Pailier	61
Effects of Particle Size and Crystalline Phases Developed after Thermal Shock Cycles on the Physical Properties and Mechanical Resistance of Cordierite-Mullite Concrete Mixes Ana Ma Paniagua Mercado, Arturo Méndez Sánchez, Elvia Díaz Valdés, and Concepción Mejía García	71

## **ADVANCED CERAMIC COATINGS: PROCESSING, PROPERTIES, AND APPLICATIONS**

- Development of New Observation System used for Deformation Measurement of Ceramic Matrix Composites at High Temperature  
Y. L. Dong, H. Kakisawa, and Y. Kagawa 81
- Anti-Reflective Surface Structures in Spinel Ceramic Windows  
Catalin M. Florea, Lynda E. Busse, Shyam Bayya, Brandon Shaw, Ishwar D. Aggarwal, and Jas S. Sanghera 89
- Ta-O-N Thin Films Deposited by Low Vacuum Reactive Sputtering  
Takashi Hashizume, Atsushi Saiki, and Kiyoshi Terayama 101
- Control of Mass-Transfer through Grain Boundaries in a Protective Alumina Layer by Dopant Configuration in Advanced EBCs  
Satoshi Kitaoka, Tsuneaki Matsudaira, Masashi Wada, Makoto Tanaka, Takafumi Ogawa, and Yutaka Kagawa 107
- Fabrication of  $K_2Ta_2O_6$  Films by Hydrothermal Method and their Optical Property  
Atsushi Saiki and Takashi Hashizume 119
- Finite Element Modeling of Compressor Blade Leading Edge Curl, Erosion and Deformation  
George M. Slota and Douglas E. Wolfe 127

## **GEOPOLYMERS—LOW ENERGY, ENVIRONMENTALLY FRIENDLY, INORGANIC POLYMERIC CERAMICS**

- Development of Thai Fly Ash Blended with Rice Husk Ash Geopolymers  
Duangrudee Chaysuwan, Chayanee Tippayasam, Pimpawee Keawpapasson, Parjaree Thavorniti, Thammarat Panyathanmaporn, Sirithan Jiemsirilers, and Cristina Leonelli 145
- Characterization of Cotton Fabric Reinforced Geopolymer Composites Modified with Portland Cement  
T. Alomayri, F. U. A. Shaikh, and I. M. Low 155

## **MULTIFUNCTIONAL METAL OXIDE NANOSTRUCTURES AND HETEROARCHITECTURES FOR ENERGY AND DEVICE APPLICATIONS**

- Synthesis of  $\gamma$ -MnOOH and  $\beta$ -MnO<sub>2</sub> Nanowires and their Electrochemical Capacitive Behavior  
Indra B. Singh and Su Moon Park 171

**ADVANCED CHARACTERIZATION AND MODELING OF  
CERAMIC INTERFACES**

The Effect of Interface and Micro-Crack on Physical Property and Performance of Ceramic Materials Justin Gao	181
Author Index	195