Contents

Preface ix

Introduction xi

GEOPOLYMERS AND OTHER INORGANIC POLYMERS

Effect of External and Internal Calcium in Fly Ash on Geopolymer Formation
Katsuda Somna and Walearat Bumrongjaroen 3

Synthesis and Thermal Properties of Fly-Ash Based Geopolymer Pastes and Mortars
Ch. Panagiotopoulou, A. Asprogerakis, G. Kakali, and S. Tsiotiis 17

Mechanical Response of Discontinuous Filament PVA Fiber Reinforced Geopolymers
Benjamin Varela and Jeffrey W. Rogers 29

Microwave Enhanced Drying and Firing of Geopolymers
Tyler A. Gubb, Inessa Baranova, Shawn M. Allen, Morgana L. Fall, Holly S. Shulman, and Waltraud M. Kriven 35

Geopolymerization of Red Mud and Rice Husk Ash and Potentials of the Resulting Geopolymeric Products for Civil Infrastructure Applications
Jian Ha and Guoping Zhang 45

The Effect of Addition of Pozzolanic Tuff on Geopolymers
Hani Khoury, Islam Al Dabsheh, Faten Slely, Yousef Abu Salha, Hubert Rahier, Muayad Esailan, and Jan Wastiels 53
Bottom Ash-Based Geopolymer Materials: Mechanical and Environmental Properties

Production of Geopolymers from Untreated Kaolinite
H. Rahier, M. Elsafan, I. Aldabshrie, F. Slaty, H. Khoury, and J. Wastiels

Phosphate Geopolymers
Arun S. Wagh

THERMAL MANAGEMENT MATERIALS AND TECHNOLOGIES

3-Dimensional Modeling of Graphitic Foam Heat Sink
Adrian Bradu and Khairul Alam

Enhancement of Heat Capacity of Molten Salt Eutectics using Inorganic Nanoparticles for Solar Thermal Energy Applications
Donghyun Shin and Debjoyoti Banerjee

Enhancement of Heat Capacity of Nitrate Salts using Mica Nanoparticles
Seunghwan Jung and Debjoyoti Banerjee

Enhanced Viscosity of Aqueous Silica Nanofluids
Byeongnam Jo and Debjoyoti Banerjee

Pumping Power of 50/50 Mixtures of Ethylene Glycol/Water Containing SiC Nanoparticles
Jules L. Routbort, Dileep Singh, Elena V. Timofeeva, Wenhua Yu, David M. France, and Roger K. Smith

COMPUTATIONAL DESIGN

Characterization of Non Uniform Veneer Layer Thickness Distribution on Curved Substrate Zirconia Ceramics using X-Ray Micro-Tomography
M. Alikkarami, H. A. Bale, and J. C. Hanan

Computational Study of Wave Propagation in Second-Order Nonlinear Piezoelectric Media
David A. Hopkins and George A. Gazonas

Impact of Material and Architecture Model Parameters on the Failure of Woven CMCS via the Multiscale Generalized Method of Cells
Kuang Liu, Aditi Chattopadhyay, and Steven M. Arnold

Kinetic Monte Carlo Simulation of Oxygen and Cation Diffusion in Yttria-Stabilized Zirconia
Brian Good
ADVANCED SENSOR TECHNOLOGY

Nano-Calorimeter Platform for Explosive Sensing 209
Seok-Won Kang, Nicholas Niedbalski, Mathew R Lane, and Debjyoti Banerjee

Polyaniline-Silica Nanocomposite: Application in Electro catalysis 221
of Acetylthiocholine
Prem C. Pandey, Vandana Singh, and S. Kumar

Electrochemical Sensing of Dopamine over Polyindole-Composite 235
Electrode
Prem C. Pandey, Dheersj S. Chauhan, and S. Kumar

Author Index 245