Contents

Foreword ix
Preface xi
Acknowledgments xiii

ENERGY AND GLASS MELTING

Strength of Glass and Glass Fibers
Hong Li 3

Operating Experience with OPTIMELT™ Regenerative Thermo-Chemical Heat Recovery for Oxy-Fuel Fired Glass Furnaces
A. Gonzalez, E. Solorzano, S. Laux, U. Iyoha, K.T. Wu, and H. Kobayashi 17

BATCHING

Optimization Program for Batch Wetting Offers Benefits in Furnace Life, Energy Efficiency, and Operational Reliability
Thomas S. Hughes, F. Philip Yu, and Blaine Krause 29

Effect of Borate Raw Material Choices on the Batch Reactions of Alkali-Lean Borosilicate Glasses
Mathieu Hubert, Anne Jans Faber, Simon Cook, and David Lever 43

Glass Cullet: Impact of Color Sorting on Glass Redox State
Stefano Ceola, Nicola Favaro, and Antonio Daneo 57

COMBUSTION, REFRACTORIES, AND SENSORS

Oxygen-Solid Fuel Combustion in Glass Melting Furnaces
Mark D. D’Agostini, Jinghong Wang, and Juping Zhao 71
Hydroprime® Gas Generators Provide Low Cost, Reliable Hydrogen for Float Glass Manufacturing
Goutam Shahani, Kyle Finley, and Nick Onelli

Corrosion of AZS Refractories—Source of Defects in Tableware Glass
P. Šimurka, J. Kraxner, P. Vrábel, and T. Paučo

How Fused Cast AZS Take Care of Secure and High Quality Glass Manufacturing
Michel Gaubil, Isabelle Cabodi, Jessy Gillot, and Jie Lu

Advanced Furnace Inspection and Monitoring Based on Radar Sensors
Yakup Bayram, Alexander C. Ruege, Peter Hagan, Elmer Sperry, and Dan Cetnar

ENVIRONMENTAL

Optimizing Low Momentum Oxy-Fuel Burner Performance in Glass Furnaces to Minimize Furnace Emissions and Alkali Volatilization
Uyi Iyoha, Hisashi Kobayashi, Euan Evenson, and Elmer Sperry

Heat Oxy-Combustion: An Innovative Energy Saving Solution for Glass Industry
Hwanho Kim, Taekyu Kang, Kenneth Kaiser, Scott Liedel, Luc Jarry, Xavier Paubel, Youssef Jumani, and Levent Kaya

MODELING

Intelligent Furnace Design and Control to Increase Overall Glass Furnace Efficiency
Erik Muijsenberg

Glass Melt Quality Optimization by CFD Simulations and Laboratory Experiments
A.F.J.A. Habraken, A.M. Lankhorst, O.S. Verheijen, and M. Rongen

FORMING

Forehearth Heating
Alan Stephens, Clive Morgan, and Stephen Sherlock

Improvements to Emhart Glass Vertiflow Mold Cooling Applications in Glass Container Production
Pierre S. Lankeu Ngankeu
Multi-Layer Glass Thickness Measurement 193
Jason Ness, Filipp Ignatovich, and Steve Heveron-Smith

The Qualification of a New Glass Strengthening Process 201
Steven Brown and Dubravko Stuhne

Author Index 207