

SPE ANTEC 2021: The Annual Technical Conference for Plastic Professionals

Online
10 - 21 May 2021

ISBN: 978-1-7138-3075-7

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2021) by the Society of Plastics Engineers
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact the Society of Plastics Engineers
at the address below.

Society of Plastics Engineers
100 Reserve Road, Suite B-310
Danbury, CT 06810 USA

Phone: (203) 740-5400

Fax: (203) 740-5405

info@4spe.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

ADDITIVE MANUFACTURING / 3D PRINTING

CHARACTERIZATION OF POLYPROPYLENE/HYDROCARBON RESIN BLENDS FOR 3D PRINTING	1
<i>Arit Das, Michael J. Bortner</i>	
MACHINE LEARNING AND DATA-DRIVEN ADDITIVE MANUFACTURING	5
<i>Maryam Emami</i>	
EFFECTS OF STEAM HEAT AND DRY HEAT STERILIZATION PROCESSES ON POLYLACTIC ACID WITH HYDROXYAPATITE COMPOSITE PRINTED BY FFF	10
<i>Jorge Mauricio Fuentes, Santiago Ferrandiz Bou</i>	
FIBER ORIENTATION MEASUREMENTS FOR LARGE ADDITIVE MANUFACTURED PARTS USING OPTICAL AND SEM IMAGING	18
<i>Rifat Ara Nargis, David A. Jack</i>	
COMPARATIVE STUDY OF FILLED AND UNFILLED PLA PRODUCED VIA INJECTION MOLDING AND 3D PRINTING	25
<i>Chethan Savandaiah, Bernhard Plank, Julia Maurer, Juergen Lesslumer, Georg Steinbichler</i>	
LARGE-SCALE EXTRUSION-BASED 3D PRINTING FOR HIGHWAY CULVERT REHABILITATION.....	33
<i>Sunil Bhandari, Roberto A. Lopez-Anido, James Anderson, Alexander Mann</i>	
FUSED FILAMENT FABRICATION FEEDSTOCK CHARACTERIZATION VIA IN-LINE RHEOLOGY	38
<i>A. R. Colon, D. O. Kazmer, A. Peterson</i>	
INVESTIGATION AND REALIZATION OF WATERTIGHT FDM STRUCTURES MADE OF ULTEM 9085 IN PRESSURIZED SYSTEMS.....	45
<i>Elmar Moritzer, Christian L. Elsner, Julian Wächter, Frederick Knoop</i>	
EFFECT OF CARBON FIBER ON THE FRACTURE TOUGHNESS OF FUSED FILAMENT FABRICATED CF/ABS COMPOSITES.....	51
<i>Karun Kalia, Amir Ameli</i>	
ENABLING MECHANICALLY ADAPTIVE 4D-PRINTING WITH CELLULOSE NANOCRYSTALS	57
<i>Tyler W. Seguine, Jacob J. Fallon, Arit Das, Emily A. Holz, Mindy R. Bracco, Justin E. Yon, E. Johan Foster, Michael J. Bortner</i>	

ADDITIVE MANUFACTURING / 3D PRINTING; BIOPLASTICS AND RENEWABLE TECHNOLOGIES

3D PRINTING SUSTAINABLE BIOCOMPOSITES FROM RECYCLED PLA AND MICRO-CRYSTALLINE CELLULOSE	60
<i>Akhilesh K. Pal, Erick O. Cisneros-López, Arturo U-Rodriguez, Feng Wu, Manjusri Misra, Deborah F. Mielewski, Alper Kiziltas, Amar K. Mohanty</i>	

ADDITIVES AND COLOR; APPLIED RHEOLOGY

CHARACTERIZATION OF POLYCARBONATE BLENDS: EXECUTIVE (FT-IR) COMPARED TO RHEOLOGY	65
<i>J. Al Sadi, A. Hawari</i>	

APPLIED RHEOLOGY

EVALUATION OF HIGH FLOW POLY ETHER IMIDE RESINS USING STRUCTURE- PROPERTY-PROCESS RELATIONSHIPS	76
<i>Manojkumar Chellamuthu, Mark Sanner</i>	
ACRYLIC ADDITIVE FOR THERMOPLASTICS MELT FLOW ENHANCEMENT	81
<i>Hailan Guo, Morris Wills, John Kohn, Felix Zhang, Mubashir Ansari, Kurt Koppi, Eric Marchbanks, Ted Price</i>	
NONLINEAR RHEOLOGICAL BEHAVIOR CARBON NANOTUBE-FILLED POLYPROPYLENE NANOCOMPOSITES: MODELING AND EXP	87
<i>Sandeep S. Pole, Avraam I. Isayev, Jing Zhong</i>	
RHEOKINETICS OF THERMAL-INDUCED GELATION OF LIQUID POLYBUTADIENE RESIN	100
<i>Samy A. Madbouly</i>	
WLF PARAMETERS AND THEIR CONNECTION TO VISCOSITY AND PHYSICAL STATE.....	105
<i>Paul Van Huffel</i>	
UNDERSTANDING THE EFFECT OF LONG CHAIN BRANCHING ON THE FLAME PROPERTIES IN POLYCARBONATE RESINS	111
<i>Shankar Kollengodu Subramanian, Tianran Chen, Himanshu Asthana</i>	
VISCOUS HEATING CORRECTION FOR POLYMER MELTS IN CAPILLARY VISCOMETRY	116
<i>Yu-Ho Wen, Chen-Chieh Wang, Chia-Hsiang Hsu, Rong-Yeu Chang</i>	

APPLIED RHEOLOGY; ENGINEERING PROPERTIES AND STRUCTURE; MEDICAL PLASTICS

SUPERHYDROPHOBIC ENCAPSULANTS FOR FHE DEVICES	120
<i>A. Bar, K. Jaju, E. Keaney, S. Kenig, H. Dodiuk, J. Mead, B. Budhlall, C. Stoessel, A. Kumar, S. Gonya</i>	

APPLIED RHEOLOGY; THERMOPLASTIC ELASTOMERS; THERMOPLASTIC MATERIALS AND FOAMS

MELTING AND CRYSTALLIZATION BEHAVIORS OF POLYPHENYLENE SULFIDE BLENDED WITH THERMOPLASTICS: A REVIEW	125
<i>Guowei Chen, Mary Hedrick, Manjusri Misra, Amar K. Mohanty</i>	

AUTOMOTIVE

THE JOURNEY TO STABILIZATION OF AUTOMOTIVE PLASTIC APPLICATIONS	129
<i>Emilie Meddah</i>	
EVALUATION OF POLYAMIDE COPPER HYBRIDS FOR AUTOMOTIVE BATTERY SYSTEMS	135
<i>Niclas Emrich, Stefan P. Meyer, Rüdiger Daub, Reinhard Schiffers</i>	
EFFECTIVE ANTIMICROBIAL PROTECTION FOR AUTOMOTIVE COMPOSITE APPLICATIONS.....	142
<i>F. Deans, H. Khan</i>	
OPTIMIZING MECHANICAL BEHAVIOR OF BASALT-NATURAL FIBER HYBRID INJECTION MOLDED COMPOSITES	145
<i>Kyleigh Rhodes, Bharath Nagaraja, Raul Pelaez Samaniego, Vikram Yadama</i>	
BIOCARBON HYBRID COMPOSITES FOR HIGH-TEMPERATURE AUTOMOTIVE APPLICATIONS.....	151
<i>Amy Langhorst, Sabrina Peczonczyk, Hannah Sun, Alper Kiziltas, Debbie Mielewski</i>	
WATER ABSORPTION BEHAVIOR OF RECYCLED PP AND PA6 COMPOSITES WITH FIBER REINFORCEMENT	156
<i>Sandeep Tamrakar, Rachel Couvreur, Alper Kiziltas, Janice Tardiff, Debbie Mielewski, John W. Gillespie Jr.</i>	

BIOPLASTICS AND RENEWABLE TECHNOLOGIES

SELF-REINFORCED POLYLACTIDE COMPOSITES MANUFACTURED BY MELT SPUNBOND TECHNOLOGY	163
<i>Amirjalal Jalali, Anthony Tuccitto, Sandra Romero-Diez, Patrick C. Lee, Chul B. Park</i>	
COMPOSTABLE ADHESIVE FORMULATIONS FOR EXTRUSION LAMINATION	168
<i>Sayli Bote, Alexander Ermlich, Shilpa Manjure</i>	
PREDICTION OF ENZYMATIC DEGRADATION OF POLY-G-CAPROLACTONE WITH ESTERASE USING A REACTION MODEL	174
<i>Iftekhar Ahmad, Mohammad Abubakar Khan</i>	
PREPARATION AND CHARACTERIZATION OF POLYLACTIC ACID-SAWDUST DEEP EUTECTIC SOLVENT EXTRACTED LIGNIN	180
<i>Saurabh Pawale, Karun Kalia, Dylan Cronin, Xiao Zhang, Amir Ameli</i>	

BUILDING AND INFRASTRUCTURE

ENHANCED DISPERSION OF LIGNIN IN PET POLYOLS FOR IMPROVED THERMAL INSULATION OF POLYURETHANE FOAMS	186
<i>Hima Haridevan, David Birnie, David A. C. Evans, Darren J. Martin, Pratheep K. Annamalai</i>	
VARIABILITY LEVERS IN ASTM D-2863 RESULTS FOR STYRENIC FOAMS	191
<i>Valentina A. Woodcraft, Ellen C. Keene, Phillip Lin, Gerald K. Leblanc</i>	

COMPOSITES

EFFECT OF GLASS FIBERS ON THE VISCOELASTIC AND THERMOMECHANICAL PROPERTIES OF POLY(ETHER ETHER KETONE)	195
<i>Samy A. Madbouly</i>	
CRYSTALLIZATION BEHAVIOR AND IMPACT PERFORMANCE OF PA6 BASED NANOCOMPOSITES.....	200
<i>Mayesha Binte Mahmud, Andrew Anstey, Vahid Shayegaan, Patrick Lee, Chul B. Park</i>	
EFFECT OF FILLER CONTENT ON THE ELECTRICAL CONDUCTIVITY OF GRAPHITE BASED COMPOSITES	206
<i>Muhammad Tariq, Utkarsh, Nabeel Ahmed Syed, Ashique Baten, Amir Hossein Behraves, Ghaus Rizvi, Remon Pop-Iliev</i>	
THE STUDY ON REPLACEMENT OF STEEL CORD REINFORCEMENTS BY SYNTHETIC FIBERS IN COMPOSITE MATERIALS	210
<i>Nabeel Ahmed Syed, Utkarsh, Mohammed Tariq, Amir H. Behraves, Ghaus Rizvi, Remon Pop-Iliev</i>	
INTRODUCTION TO POSSIBLE HYBRID VENEER COMPOSITE LAMINATED PANELS	214
<i>Avishek Chanda, Nam Kyeun Kim, Debes Bhattacharyya</i>	
INFLUENCE OF PROCESSING PARAMETERS ON FIBER LENGTH DEGRADATION DURING INJECTION MOLDING	219
<i>Elmar Moritzer, Franziska Bürenhaus</i>	
STUDY ON THE FLOW-FIBER COUPLING AND ITS INFLUENCE ON THE SHRINKAGE OF FRP INJECTION PARTS	224
<i>Cheng-Hong Lai, Chao-Tsai Huang, Jia-Hao Chu, Wei-Wen Fu, Sheng-Jye Hwang, Hsin-Shu Peng, Chih-Che Wu, Chun-I Tu</i>	
A CO-MONOMER RESIN MATRIX DESIGN FOR PROCESSING OF POLYMER CONCRETE COMPOSITES	230
<i>Mai T. K. Dang, Mostafa Nikzad, Khanh V. Truong, Syed Masood, Igor Sbarski</i>	
PHYSICAL ANALYSIS OF MULTIFUNCTIONAL AEROGELS MADE OF POLYMERIZED SILICA PRECURSORS WITH STIFF AND FLEXIBLE BACKBONE.....	237
<i>Solmaz Karamikamkar, Omid Aghababaei Tafreshi, Shahriar Ghaffari Mosanenzadeh, Hani E. Naguib, Chul B. Park</i>	
FOAM INJECTION MOLDED LIGHTWEIGHT PP COMPOSITE FOAMS REINFORCED BY FIBRILLARY PTFE WITH OUTSTANDING	242
<i>Chulb. Park, Jinchuan Zhao</i>	
STUDY OF MECHANICAL AND MACHINABILITY BEHAVIOUR OF NATURAL FIBRE COMPOSITES	248
<i>Raveen John, Richard Lin, Krishnan Jayaraman, Debes Bhattacharyya</i>	
CONTROLLED RELEASE OF ESSENTIAL OILS USING LAMINAR NANOCCLAY AND HALLOYSITE / ESSENTIAL OIL COMPOSITE.....	253
<i>J. N. Saucedo-Zuñiga, S. Sánchez-Valdes, E. Ramírez-Vargas, L. Guillen, L. F. Ramos-Devalle, J. A. Rodriguez</i>	
IN-LINE LAMINATE DECORATIVE THERMOPLASTIC COMPOSITE PANEL	258
<i>Liqing Wei, Ruomiao Wang, Mark O. Mason</i>	

DECORATING AND ASSEMBLY

SCRATCH RESISTANT COATINGS: HIGH PERFORMANCE, ECONOMIC SOLUTIONS FOR HIGH QUALITY LOW GLOSS FINISHES.....	263
<i>Robert Randant</i>	

ENGINEERING PROPERTIES AND STRUCTURE

IMPROVING THE HYDROPHOBICITY OF POLYMERS THROUGH SURFACE TEXTURING.....	268
<i>Mohammad Motaher Hossain, Vinay Reddy Lokasani</i>	
SOLID-STATE SHEAR PULVERIZATION OF ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE FOR MECHANICAL RECYCLING.....	275
<i>Riggs W. Johnson, Katsuyuki Wakabayashi</i>	
TENSILE SPECIMEN PREPARATION METHOD IMPACTING FAILURE BEHAVIOR	280
<i>Sean S. Teller, Jorgen S. Bergstrom</i>	
SPREADING COEFFICIENT: A SIMPLE TOOL FOR PREDICTING FAILURE IN ADHESIVES.....	285
<i>Ammar Patel, Yunyang Qiang, Dian Yuan, Liang Yue, Ica Manas-Zloczower</i>	
THE USE OF DIBLOCK CARBON NANOTUBES TO INCREASE FRACTURE TOUGHNESS AT IMMISCIBLE BLEND INTERFACES	292
<i>Fatoumata Ide Seyni, Lawrence Barrett, Steven Crossley, Brian P. Grady</i>	
SCRATCH BEHAVIOR OF POLYROTAXANE-MODIFIED POLY(METHYLMETHACRYLATE).....	296
<i>Glendimar Molero, Chia-Ying Tsai, Shuntaro Uenuma, Kohzo Ito, Hung-Jue Sue</i>	
INLINE CROSS-LINKING DEGREE MEASUREMENT IN CONTINUOUS VULCANIZATION OF RUBBER.....	301
<i>Christian Hopmann, Sebastian Kammer, Fabian Fey, Martin Facklam</i>	
COMPARATIVE CREEP EVALUATION OF POLYACETAL AND POLYKETONE RESINS	306
<i>Jeffrey A. Jansen</i>	
WETTING CHARACTERISTICS OF MICROSTRUCTURES ON INJECTION MOLDED PARTS	312
<i>Joshua Krantz, Davide Masato, Ashley Caiado, Leonardo Piccolo, Marco Sorgato, Giovanni Lucchetta</i>	
MODELING THE OPTIMAL CELLULAR STRUCTURE IN SUPERIOR INSULATING MICROCELLULAR AND NANOCELLULAR FOAMS.....	317
<i>Piyapong Buahom, Chongda Wang, Mohammed Alshrah, And Chul B. Park, Guilong Wang, Pengjian Gong, Minh-Phuong Tran</i>	
TRANSPARENT LAYERED COMPOSITE FOR PROTECTIVE EYEWEAR APPLICATIONS.....	322
<i>Sean McDonald, Fabian Ullrich, Davide Masato, Alexander Krueger, Shailendra Pal Veer Singh, Alireza Amirkhizi</i>	
NUMERICAL AND EXPERIMENTAL STUDIES ON WARPAGE OF FLAT PANEL PACKAGES.....	327
<i>Sejin Han, Franco S. Costa, Renn Chan Ooi</i>	

UNDERSTANDING CURE, MECHANICAL PROPERTIES OF CARBON BLACK COMPOSITES AND IMMISCIBLE POLYMER BLENDS	333
<i>Saurav S. Sengupta, Paul J. Brigandi</i>	

EXTRUSION

PRODUCT-RELATED PROCESS DATA ACQUISITION IN BLOWN FILM EXTRUSION	337
<i>Christoph Dohm, Reinhard Schiffers</i>	
SIMULATION OF THE FLOW IN A BILAYER PVC WINDOW PROFILE DIE WITH GRADUALLY CHANGING CALIBRATOR PROFILES	342
<i>Mahesh Gupta, Kim Ryckebosch</i>	
APPLYING THE SHOOTING METHOD TO PREDICT THE CO-EXTRUSION FLOW OF NON-NEWTONIAN FLUIDS THROUGH RECTANGULAR DUCTS	349
<i>Alexander Hammer, Wolfgang Roland, Christian Marschik, Georg Steinbichler</i>	
OPERATING PERFORMANCE OF FREE-ROTATING MIXING SLEEVES IN SINGLE-SCREW EXTRUSION.....	356
<i>Mirco Janßen, Reinhard Schiffers, Philipp Eubel</i>	
SIMULATING FLOW THROUGH CHANNELS WITH NOVEL CROSS-SECTIONS: PRESSURE DROPS AND FLOW COEFFICIENTS	362
<i>Jan W. Kummerow, Reinhard Schiffers</i>	
EVALUATION OF SUB AND NEAR CRITICAL CARBON DIOXIDE FOR LOW PROCESSING TEMPERATURE OF MEDICAL THERMOPLASTIC POLYURETHANE	367
<i>Sarn-Ii Baru, Laurence Fitzhenry, Siobhan Matthews, Philip Walsh, Eric Marchese, Austin Coffey</i>	
FILTERABILITY OF RAVEN 1300 ULTRA CARBON BLACK FOR FINE DENIER FIBER APPLICATIONS.....	373
<i>Jun Tian, Natalie K. Harris</i>	
NEW CONCEPT FOR MELTING IN SINGLE SCREW EXTRUDERS	376
<i>Robert A. Barr, Jeff A. Myers, Aaron F. Spalding</i>	
DEVELOPMENT OF AN ANALYTICAL MATHEMATICAL MODELLING APPROACH FOR A MORE PRECISE DESCRIPTION OF DISPERSE MELTING.....	381
<i>Marius Dörner, Volker Schöppner</i>	
EVALUATION OF THE DISTRIBUTIVE MIXING QUALITY BASED ON PARTICLE TRACKING AND DELAUNAY TRIANGULATION	389
<i>Maximilian Frank, Volker Schöppner</i>	
INVESTIGATION OF INFLUENCES ON THE MELTING OF POLYETHYLENE AND POLYSTYRENE IN A CO-KNEADER.....	396
<i>Johannes Rudloff, Marieluise Lang, Thomas Hochrein, Martin Bastian</i>	
REPRODUCIBILITY ANALYSIS OF FIBER LENGTH MEASUREMENTS DURING PROCESSING WITH TWIN SCREW EXTRUDERS.....	402
<i>Hatice Malatyali, Volker Schöppner, Seyit Ali Akar, Felix Hanselle, Laura Austermeier</i>	
ANALYSIS OF LEAKAGE FLOW IN PRESSURE-GENERATING MELT-CONVEYING ZONES	406
<i>Christian Marschik, Wolfgang Roland, Alexander Hammer, Georg Steinbichler</i>	

IMPROVED POLYPROPYLENE THERMOFORMABILITY THROUGH POLYETHYLENE LAYERING.....	414
<i>Laryssa Meyer, Alex M. Jordan, Kyungtae Kim, Bongjoon Lee, Frank S. Bates, Christopher W. Macosko, Ehsan Behzedfar, Olivier Lhost</i>	

INFLUENCE OF TWIN SCREW CONFIGURATION AND PROCESSING ON KETOPROFEN DISSOLUTION IN POLYMER BLENDS	417
<i>Laura Restrepo-Urbe, Nicolas Ioannidis</i>	

MITIGATING RESIN DEGRADATION VIA NITROGEN INERTING FOR SINGLE-SCREW EXTRUDERS	426
<i>Mark A. Spalding, Anthony C. Neubauer</i>	

MODELING FULLY INTERMESHING CO-ROTATING TWIN-SCREW EXTRUDER KNEADING-BLOCKS: PART A CONVEYING CHARACTERISTICS	431
<i>Ursula Stritzinger, Wolfgang Roland, Hanny Albrecht, Georg Steinbichler</i>	

MODELING FULLY INTERMESHING CO-ROTATING TWIN-SCREW EXTRUDER KNEADING-BLOCKS: PART B POWER CONSUMPTION	438
<i>Wolfgang Roland, Ursula Stritzinger, Christian Marschik, Georg Steinbichler</i>	

FAILURE ANALYSIS AND PREVENTION

LIFETIME PREDICTION OF CONTINUOUS FIBER-REINFORCED PLASTICS BASED ON NONLINEAR DAMAGE ACCUMULATION	445
<i>Simon Rocker, Reinhard Schiffers, Lars Gerdes, Daniel Hülsbusch, Frank Walther</i>	

DEVELOPING PHOTOPOLYMERIZABLE ACRYLATE RESIN FORMULATION FOR IMPACT MODIFIED 3D PRINTED THERMOSETS.....	451
<i>Chinmay Saraf, Amy Niu, Alan J. Lesser</i>	

FAILURE ANALYSIS AND PREVENTION; POLYMER ANALYSIS

FAILURE ANALYSIS OF PRODUCTS WITH PLASTIC TO METAL THREADED CONNECTIONS.....	459
<i>Gaurav Nagalia, Anand R. Shah</i>	

FAILURE ANALYSIS CASE STUDY: THE GOOD AND THE BAD PVC CABLE COATINGS	465
<i>Sergey Shilov</i>	

FLEXIBLE PACKAGING

OPTIMIZING FILM BENDING STIFFNESS AND COEFFICIENT OF FRICTION FOR HIGH SPEED CONVERTING	467
<i>Daniel R. Ward</i>	

OPTIMIZATION OF DOUBLE-LIP COOLING RINGS IN BLOWN FILM EXTRUSION CONSIDERING THE COANDA-EFFECT.....	471
<i>Lars Kraus, Tobias Vossel, Martin Facklam, Christian Hopmann</i>	

ADHESIVE RESIN TECHNOLOGY FOR ORIENTED MULTILAYER FILMS	476
<i>Mou Paul, Barry Morris, Jeff Weinhold, Karlheinz Hausmann</i>	

OPTIMIZATION OF ETHYLENE ACRYLIC ACID AND LOW DENSITY POLYETHYLENE BLEND IN TIE-LAYER.....	482
<i>Yong Zheng, Yiqing Jiao, Haewoong Park, Frank Chen, Byoungcheon Jo</i>	

INJECTION MOLDING

FISCHER-TROPSCH HYDROCARBONS AS PROCESSING AIDS IN INJECTION MOLDING: AN OVERVIEW	488
<i>Stefan De Goede, Pieter Van Helden, Steve Torchia, Philip Richards</i>	

EVALUATION OF PRESSURE REDUCTION FOR VARIOUS MATERIALS AT VARIOUS LENGTH TO THICKNESS RATIOS USING AN IMFLUX® CONSTANT PRESSURE PROCESS.....	495
<i>William F. Lawless III, Rick A. Pollard, Darien R. Stancell</i>	

EXPERIMENTAL & ANALYTICAL INVESTIGATION OF INCOMPLETE FILLING DEFECTS DURING HOT RUNNER BASED INJECT.....	499
<i>Khalid Alqosaibi, Chandresh Thakur, Hussam Noor, Alaauldeen Duhduh, Animesh Kundu, John Coulter</i>	

INFLUENCE OF INJECTION MOLDING PARAMETERS ON THE SURFACE STRUCTURE OF POLYAMIDE PARTS	505
<i>Marius Janßen, Mirco Janßen, Reinhard Schiffers, Robin Blankenagel Felix Heinzler, Marvin Wagner</i>	

NOVEL FOAM INJECTION MOLDING OF POLYAMIDE/GLASS FIBER (PA/GF) COMPOSITES USING GAS-LADEN PELLETS	510
<i>Huanguang Yang, Demitri Shotwell, Jing Jiang, Edward Chen, Lih-Sheng Turng</i>	

SIMULATIVE ANALYSIS OF THE FILLING PROCESS IN THE TWO-COMPONENT-GITBLOW-PROCESS ON ORGANO SHEETS	515
<i>Elmar Moritzer, Michael Kroeker</i>	

STUDY ON THE QUANTIFICATION OF THE ADVANCEMENT OF CORE MATERIAL IN CO-INJECTION MOLDING PRODUCTS	521
<i>Kuan-Yu Ko, Chao-Tsai Huang, Chih-Chung Hsu, You-Sheng Zhou, David Hsu, Shi-Chang Tseng</i>	

INVESTIGATE ON THE DEGREE OF ASSEMBLY FOR COMPONENTS IN AN INJECTION FAMILY MOLD SYSTEM	526
<i>Tsai-Wen Lin, Chao-Tsai Huang wen-Ren Jong , Shia-Chung Chen</i>	

CHARACTERIZATION OF IN-MOLD SHRINKAGE USING A MULTI-VARIATE SENSOR	531
<i>Davide Masato, David Kazmer, Rahul Panchal</i>	

INFLUENCE OF CHEMICAL BLOWING AGENTS ON THE FILLING BEHAVIOR OF WOOD-PLASTIC-COMPOSITE MELTS	536
<i>Elmar Moritzer, Felix Flachmann</i>	

THE EFFECT OF OROTIC ACID ON THE CRYSTALLINITY DEVELOPMENT IN POLYLACTIC ACID DURING VIBRATION ASSISTED INJECTION MOLDING	541
<i>Peng Gao, Faisal J. Alzahrani, Animesh Kundu, John P. Coulter</i>	

ANALYSIS OF INJECTION MOLDING SIMULATION OF STATIC MIXER WITHIN THE RUNNER SYSTEM TO IMPROVE MELT HOMOGENEITY, FILLER DISTRIBUTION, AND PART QUALITY	548
<i>Demitri Shotwell, Stefanie Glas, Edward Chen, Lih-Sheng Turng</i>	

EFFECT OF STRAIN RATE AND THERMAL HISTORY ON THE MECHANICAL PROPERTIES OF POLYCARBONATE.....	554
<i>Fabian Ullrich, Davide Masato, Javiervera-sorroche, Alexander Krueger, Shailendra Pal Veer Singh, Alireza Amirkhizi</i>	

JOINING OF PLASTICS AND COMPOSITES

ANALYSIS OF PARAMETERS FOR HEAT SEALING AND ULTRASONIC SEALING OF PET/PE FILMS.	559
<i>Flint Colvin, Avraham Benatar</i>	

A METHOD FOR CROSS-SECTIONAL ANALYSIS OF POLYMER WELDS	565
<i>Miranda Marcus, Matt Nitsch</i>	

DURABLE BOND OF ORIGINALLY INCOMPATIBLE MATERIALS BY USING THE INMOULD-PLASMA PROCESS	571
<i>Elmar Moritzer, Frederik Mühlhoff</i>	

MEDICAL PLASTICS

THREE TRENDS IN HEALTHCARE ADHESIVES.....	577
<i>Joanne Moody</i>	

ADHESION OF OVERMOLDED TPE TO FR-PC/ABS: EFFECT OF TPE PROPERTIES AND SUBSTRATE COLOR RECIPE	581
<i>Pierre Moulinié, Godwin Suen</i>	

EFFECT OF MOLDING PARAMETERS ON ORIENTATION AND TENSILE PROPERTIES OF POLYCARBONATE	585
<i>Pierre Moulinié, Isaac Platte, Ravishankar Ayyar, Kyle Kulwicki, Louis Somlai</i>	

MEDICAL PLASTICS; THERMOPLASTIC ELASTOMERS

POLYPROPYLENE/GROUND TIRE RUBBER (PP/GTR) COMPOSITES PRODUCED VIA ROTATIONAL MOLDING.....	591
<i>Y. Dou, D. Rodrigue</i>	

MOLD TECHNOLOGIES

NUMERICAL INVESTIGATION ON THE EFFECT OF HEAT TRANSFER COEFFICIENT IN INJECTION MOLDING	596
<i>Anshal Jilka, Leonardo Piccolo, Davide Masato</i>	

PATH-PLANNING ALGORITHM FOR THE AUTOMATIC GENERATION OF A COOLING CHANNEL LAYOUT IN INJECTION MOULDS	601
<i>Tobias Hohlweck, Christian Hopmann</i>	

MULTI-SCALE MODELING OF THE REPLICATION OF SUBMICRON-STRUCTURES BY MICRO INJECTION MOLDING.....	608
<i>Piccolo Leonardo, Giovanni Lucchetta, Marco Sorgato, Davide Masato</i>	

POLYMER ANALYSIS

RESEARCH ON TRANSFER LEARNING APPLIED TO CHARACTERISTIC PREDICTION OF INJECTION MOLDED PRODUCTS.....	614
<i>Yan-Mao Huang, Wen-Ren Jong, Shia-Chungchen</i>	

METHOD TO EVALUATE SHRINK FILM MATERIAL PROPERTIES	623
<i>Masoud Allahkarami, Michael Rector, Sudheer Bandla, Jay C. Hanan</i>	

OPTIMIZATION OF PVDF EXTRUSION TO PRODUCE ELECTROACTIVE FILAMENT FOR FFF	629
<i>Aya A. Saleh, Garrett W. Melenka, Siu Ning Leung</i>	

ANALYTICAL CHARACTERIZATION OF ACID COPOLYMERS AND IONOMERS	636
<i>Praveenkumar Boopalachandran, Yongfu Li, Steve Rozeveld, Barry Morris, Leslie O'Leary, Josh Enokida</i>	

MONITORING DEGRADATION OF NUCLEAR CABLE INSULATION SUBJECTED TO SEQUENTIAL AND SIMULTANEOUS THERMAL	641
<i>Madhusudhan R. Pallaka, Mychal P. Spencer, Tucker T. Bisel, Yelin Ni, Mark K. Murphy, Leonard S. Fifield</i>	

THERMAL AND MECHANICAL TECHNIQUES FOR TROUBLESHOOTING POLYLACTIC ACID PROCESSING ISSUES.....	646
<i>Tianhong Chen, Louis Waguespack, Gregory W. Kamykowski</i>	

POLYMER MODIFIERS AND ADDITIVES

NOVEL FLAME RETARDANTS BASED ON IONIC LIQUIDS FOR PMMA, PC AND TPU PLASTICS	651
<i>Yanjie Xu</i>	

PRODUCT DESIGN AND DEVELOPMENT

DESIGNING FOR SIX SIGMA (DFSS) - A SYSTEMATIC APPROACH TO ROBUST PLASTIC PART DESIGN	656
<i>Vikram Bhargava</i>	

ANALYSIS OF THE STATE OF THE ART OF TECHNICAL DRAWINGS OF PLASTIC MOLDED PARTS REGARDING TOLERANCES	663
<i>Anja Falke, Martin Bohn, Tim A. Osswald</i>	

THE MOST FREQUENT DESIGN FLAW THAT LEADS TO PART FAILURE	672
<i>Paul J. Gramann</i>	

INTEGRATION OF POLYCARBONATE THERMOPLASTIC IN LED LIGHTING.....	679
<i>Nicolas J. Sunderland, Jim Lorenzo</i>	

PRODUCT DESIGN AND DEVELOPMENT; SUSTAINABILITY/RECYCLING

INFLUENCE OF PROCESSING ROUTE ON THE PROPERTIES OF POLYOLEFIN BLENDS.....	685
<i>Christoph Burgstaller</i>	
STYRENIC BLOCK COPOLYMERS FOR ENABLING IMPROVED PERFORMANCE OF POST-CONSUMER RESINS	691
<i>Amit Desai, Yuliya Streen</i>	

SUSTAINABILITY/RECYCLING

REACTION MODEL TO PREDICT PHOTO DEGRADATION MECHANISM OF POLYETHYLENE CONTAINING CB AND HLAS.....	696
<i>Iftekhar Ahmad, Mohd Danish Alhindi</i>	
SOME PROPERTIES OF 100% RECYCLED OCEAN PLASTIC POLYOLEFINS.....	704
<i>Juliana Covarrubias, Christofer Owen, Evan Impink, Molly House, Nicole Hoekstra, Cecile Grubb, John Misasi</i>	
SUSTAINABLE PROCESSING AIDS TO ENHANCE THE PERFORMANCE OF PLASTICS WITH RECYCLED CONTENT	711
<i>Cristiano R. De Santi, Domenic Dimondo, Christy Sapp, Carla Toth, Michael Pluimer</i>	
DEPOLYMERIZATION KINETICS OF RECYCLED POLYETHYLENE TEREPHTHALATE DURING MELT MIXING.....	717
<i>Akanksha Patel, Shawn Martey, Margaret J. Sobkowitz</i>	
ADVANCES IN EXTRUSION BLOW MOLDING OF POST-CONSUMER RESIN.....	721
<i>Ian P. Query</i>	
SEPARATION OF MULTI-COMPONENT PARTS FOR MECHANICAL RECYCLING	729
<i>Matthias Hopp, Frederik Mühlhoff</i>	
IMPACTS OF DEGRADED SURFACE REMOVAL ON MECHANICALLY RECYCLED MARINE DEBRIS	736
<i>Christofer T. Owen, Cecile Grubb, John Misasi</i>	
DIMENSIONAL AND MECHANICAL COMPARISON OF THE CONVENTIONAL INJECTION MOLDING PROCESS TO IMFLUX'S CONSTANT PRESSURE PROCESS FEATURING AVA TECHNOLOGY.....	742
<i>Lexington Peterson</i>	
INCREASING THE EFFICIENCY OF THE CONTINUOUS DEPOLYMERISATION OF POLYSTYRENE.....	747
<i>Philipp Schäfer, Nils Dauber, Martin Facklam, Christian Hopmann</i>	
CLEAVABLE COMONOMERS ENABLE DEGRADABLE, RECYCLABLE THERMOSET PLASTICS	753
<i>Peyton Shieh, Keith E. L. Husted, Jeremiah A. Johnson</i>	

THERMOFORMING

SIMULATION OF THERMOFORMING PROCESS FOR TRUCK ROOF FAIRING APPLICATIONS.....	757
<i>Amol Avhad, Carlos Pereira, Raghavendra Janiwarad, Bhaskar Patham, John Perdikoulis</i>	
INFLUENCE OF THE PLUG ROUGHNESS ON THE WALL THICKNESS DISTRIBUTION IN PLUG-ASSISTED THERMOFORMING.....	765
<i>Dennis Balcerowiak, Christian Hopmann, Martin Facklam</i>	

THERMOPLASTIC ELASTOMERS

A HANSEN COMPATIBILITY APPROACH IN UNDERSTANDING SOLVENT BONDING BETWEEN ACRYLIC COPOLYMERS.....	772
<i>Pooja Bajaj, Kay Bernhard, Dirk Heyl, Maurice Biagini</i>	
EFFECT OF RUBBER SURFACE TREATMENT ON THE PROPERTIES OF ROTOMOLDED THERMOPLASTIC ELASTOMERS.....	778
<i>Roberto C. Vázquez-Fletes, Denis Rodrigue, Gustavo Gallardo-Paniagua, Erick O. Cisneros-López, Pedro Ortega-Gudiño, Rubén González-Núñez</i>	

THERMOPLASTIC MATERIALS AND FOAMS

EXTRUSION FOAMING OF NEWLY DEVELOPED HIGH-MELT-STRENGTH POLYPROPYLENE.....	782
<i>Eric Kim, Mu Sung Kweon, Sandra Romero-Diez, Patrick C. Lee, Anvit Gupta, Xuejia Yan, Caitlin Spofford, George Pehlert</i>	
DESIGN AND ENGINEERING OF INSOLUBLE, HIGH PERFORMANCE STARCH FOAMS VIA EXTRUSION TECHNOLOGY.....	787
<i>Apoorva Kulkarni, Ramani Narayan</i>	
INJECTION MOLDABLE 5G PLASTIC ANTENNA DIPOLE.....	795
<i>Priyanka Bhat, Jongwoo Lee, Jin Jung, Somasekhar Bobba</i>	
IN SITU VISUALIZATION OF MICROSTRUCTURE OF POLYPROPYLENE UNDER SHEAR AND CO ₂ PRESSURE.....	800
<i>S. Romero-Diez, M. S. Kweon, E. Kim, C. B. Park, P. C. Lee, A. Gupta, X. Yan, G. Pehlert</i>	
3D NUMERICAL SIMULATION AND EXPERIMENTAL OBSERVATION OF BUBBLE GROWTH AND COLLAPSE IN NITROGEN-GAS SATURATED MOLTEN POLYMER FOR THE CORE-BACK FOAM INJECTION MOLDING.....	805
<i>Kentaro Taki, Allen Peng, Barry Pai, Grace Chang, Robert Chang, Jim Hsu, Hideo Akimoto, Hisahiro Tanaka, Masato Goto</i>	
CELL DISSOLUTION IN HIGH-PRESSURE FOAM INJECTION MOLDING: TOWARDS A MORE EFFICIENT PACKING.....	810
<i>Chongda Wang, Vahid Shaayegan, Chul B. Park, Franco Costa, Sejin Han</i>	

Author Index