

Polyurethanes Technical Conference 2010

**Houston, Texas, USA
11-13 October 2010**

ISBN: 978-1-61782-706-8

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© (2010) by the American Chemistry Council
All rights reserved.

Printed by Curran Associates, Inc. (2011)

For permission requests, please contact the American Chemistry Council
at the address below.

American Chemistry Council
1300 Wilson Boulevard
Arlington, Virginia 22209

Phone: (703) 741-5000
Fax: (703) 741-6050

www.americanchemistry.com

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

AUTOMOTIVE 1: ADVANCES IN EMANATION REDUCTION AND RENEWABLE CONTENT

Superior Processing New All-MDI Solutions for Automotive Seating with Low Emission of Volatile Organic Compounds (VOC)	1
<i>Sabrina Fregni, Alain Fanget</i>	
Emanation Reduction Catalysts for the Production of Flexible Polyurethanes	18
<i>Courtney Thurau, Jane Kniss, James Tobias, Juan Burdeniuc, Renee Keller, Allen Arnold</i>	
Lightweight Load Floor with Substantial Renewable Resource Content	42
<i>Allan James, Danielle Paolini, Andrea Marsales, Kurt Katterloher, Brad Armstrong</i>	
Choosing an Optimal Surfactant to Maximize the Usage Level and Processing Performance of NOPs in HR Molded Foams	58
<i>Bill Bunting, Mladen Vidakovic, Martin Glos</i>	
A Study on Non-Shrink Multipurpose Foam for Manufacturing Automobile Seat Pad	71
<i>H. S. Kim, H. H. Park</i>	

AUTOMOTIVE 2: TESTING AND RECYCLING

Automotive Seating Foam Hardness Review and Recommended Improved Testing Methodology	77
<i>Robert Lockwood, Brent Hodge, Asad Ali, Roy Pask, G. Ron Blair, Mark Weierstall</i>	
Long Term, In-Vehicle Polyurethane Seating Durability Performance	95
<i>G. Ron Blair, Mark Weierstall, David Zedan, Hamdy Khalil</i>	
Use of One Component Moisture-Cured MDI Binders to Recycle Landfill-Bound, Post-Industrial Automotive Headliner Scrap	100
<i>Jean-Jacques Katz</i>	

CASE 1

Environmentally Progressive PU Coating Technologies with Enhanced Properties and Additional Functions	108
<i>Jiakuan Sun, Weiqi Hua</i>	
New Technology for Improved Compatibility of Polyols and Chain Extenders in CASE Systems	120
<i>Erik Hulting, Christian Biecker, Ralf Hoffmann, René Nagelsdiek</i>	
An Additive Approach to Expanding the Performance Ranges of Conventional Polyester, Polyurethane Adhesives	126
<i>Ana Maria Cano Sierra, Christian Scheffner, Andrea Fruth, Bruce Ernst</i>	
FilterPave® Porous Paving System - An Innovative Hard Surface Pavement Using Post-Consumer Recycled Glass	140
<i>Steven Hicks, David Bower, William Handlos</i>	
New Tin and Mercury Free Organometallic Catalysts for CASE Urethane Applications	148
<i>John Florio, Ravi Ravichandran, Bing Hsieh, Robert Coughlin</i>	

CASE 2

New Developments in Aromatic MDI for Use in Spray Polyurea	159
<i>Roeland Tuinman, Katie Skok, Kevin Buck</i>	
Influence of Soft Segment Polyol on Properties and Durability of Polyurethane Elastomers	168
<i>V. Costa, A. Nohales, P. Félix, C. M. Gómez</i>	
A New Method for Prediction of Hydrolysis Rates of Glass Syntactic Polyurethane in Deep Sea Applications	176
<i>Jeffrey Dodge, Anping Wang, Karl Gust, Valerie McCarthy</i>	
A New Water Soluble Catalyst for Two-Component Waterborne Polyurethane Coatings	194
<i>Leon Perez, Lanny Venham</i>	

Reactive Polysulfide Polyols and Chain-extenders for Property Enhancement in Urethanes	207
<i>Thomas Upshaw, John Blagg, Alex Vainer, Aleksander Yam</i>	

CHEMISTRY AND FUNDAMENTALS

New Non-Yellowing Flexible Polyurethane Foam Using Modified HDI	217
<i>Kentaro Sonoda, Keita Ishibashi, Hiroyuki Ito, Naoya Yoshii</i>	
Novel Polyisobutylene-Based Polyurethanes with Unprecedented Combinations of Mechanical Properties, Chemical Stability, and Biocompatibility	223
<i>Jungmee Kang, Gabor Erdodi, Joseph Kennedy</i>	
Rapid Development of Rigid Foam Systems Thru Use of Computer-Aided Simulation	229
<i>Augusto Ibay</i>	
Glycerine Carbonate a Bio-Based Reactive Blocking Agent and Other Bio-Based PU Additives	235
<i>Nick Kob, Aisa Sendjarevic, Niralil Lathia</i>	
A Quantum Chemical Investigation of Reaction Mechanisms of Isocyanate Group with Water and the Function of Water-Blowing Tertiary Amine Catalyst on the Mechanisms	247
<i>Satoshi Murayama, Yu Yanagihara, Takao Suzuki, Hiroyuki Kiso</i>	

CONSTRUCTION 1: ADVANCING THE SCIENCE OF SPF FOR THE CONSTRUCTION INDUSTRY

The Use of ccSPF in High Performance Wall Assemblies	262
<i>Mason Knowles</i>	
Continuation of Next Generation (LGWP) of Blowing Agents for Spray Foam Applications	276
<i>Mary Bogdan, Michael Ross, David Williams</i>	
Novel Catalytic Additive for Water Blown Spray Polyurethane Foams	288
<i>Katsumi Tokumoto, Hiroyuki Kiso, Yoshihiro Takahashi, Jeff Tucker</i>	
Reducing Environmental Impact for Spray Foam Systems	297
<i>Gary Andrew, Jean Vincent, Goran Zarkov, Tim Miller</i>	
The Detection of Stud Line Cracking in Metal Stud Walls	309
<i>Steven Crain, Dalwinder Gill, Medhat Hanna, Donald Leblanc</i>	

CONSTRUCTION 2: ADVANCING THE SCIENCE OF CONSTRUCTION MATERIALS

Long Term Aging of Closed-Celled Foam Insulation	320
<i>John Murphy</i>	
Dimensional Stability of Polyiso Insulation Boards: A Detailed Analysis	330
<i>Sachchida Singh, Sheila Dubs, John Letts, Timothy Tackett</i>	
Evaluation of HBA-2, A Low GWP Blowing Agent, in Pour-in-place Panel Applications	350
<i>Jim Ling, David Williams</i>	
Enhanced Polyisocyanurate Foams for Metal Faced Panels	360
<i>Giuseppe Vairo, Luigi Pellacani, Luigi Bertucelli, Paolo Golini, Luca Lotti</i>	
Effects of Adhesion Promotion Additives on Polyisocyanurate Foams	370
<i>Kenneth Willoughby</i>	

ENERGY CRITICAL FOAMS

Low Climate Change Impact Solution: Household Refrigerator/Freezer	381
<i>James Bowman, David Williams, Samuel Yana Motta</i>	
Further Development of FEA-1100: A Low GWP Foam Expansion Agent	392
<i>Gary Loh, Joseph Creazzo, Mark Robin</i>	
A Continued Investigation of AFA-L1, A New Low GWP Blowing Agent	406
<i>Joseph Costa, Ben Chen, Laurent Abbas, Philippe Bonnet</i>	
Comparison of Gaseous and Liquid Low GWP Blowing Agents with HFC 134a and HFC 245fa in Rigid Polyurethane Insulating Foams	415
<i>Steven Schilling</i>	
Long Term Energy Consumption Performance of Appliance Cabinets: Measurements and Analysis	423
<i>Sachchida Singh, Kenneth Copeland, Alan Hamilton</i>	

FLAMMABILITY PERFORMANCE AND FLAME RETARDANTS

MDI Slabstock Foam - Flammability Performance without Added Flame Retardants	438
<i>Raymond Neff, Theodore Smiecinski, Victoria Manea</i>	
New Flame Retardants For Flame Lamination Applications	447
<i>Eric Geiger, Jody Ju</i>	
New Product Development in Flame Retardants for the Polyurethane Industry	458
<i>Michael Nagridge, Manny Pinzoni, Andrew Piotrowski, Jeffery Stowell, Barbara Williams</i>	
In-House Production of Aromatic Polyester Polyols and Their Use to Improve the Flame Retardant Properties of Rigid Foams	466
<i>André Stoilkov, Ralf Knief</i>	
New Sprayable Polyurethane System for The Production of Fire Resistant Articles and Coatings	477
<i>Heiko Tebbe, John Sawaya</i>	

FLEXIBLE FOAMS

Development of Next Generation PU Foams for Mattresses	490
<i>Takayuki Sasaki, Daisuke Kaku, Jim Scott, Kageyu Noro, Manami Nozaki</i>	
RUBINATE® MDI Based Visco-elastic Foams	501
<i>Yun-Shan Liu, Glyn Davies, Verlin Poole</i>	
All MDI Viscoelastic Slabstock Foam	509
<i>Xinjian Liu, Qianhe Zhang, Fangqian Lin, Pengmin Li</i>	
Improved Stability of Low Density Slabstock Foams Using Polymeric Lactone Based Antioxidants	516
<i>Mark Ragsdale, Chris Sculthorpe, Jim Spry</i>	
Novel Gelling Catalyst for Non-Emission Flexible Polyurethane Foam	528
<i>Takao Suzuki, Yoshihiro Takahashi, Hiroyuki Kiso, Jeff Tucker</i>	

HEALTH, SAFETY AND THE ENVIRONMENT

A Proposed Methodology for Development of Building Re-Occupancy Guidelines Following Installation of Spray Polyurethane Foam Insulation	538
<i>Brian Karlovich, Carl Thompson, James Lambach</i>	
Monitoring of HFC-245fa Exposure in Spray Foam Applications	548
<i>Kevin Blair, Mary Bogdan, Elizabeth Jennison</i>	
Evaluation of Particulates Generated During Trimming and Cutting of Spray Polyurethane Foam Insulation	563
<i>Mark Spence, Cynthia Graham</i>	
Selecting Respiratory Protection for Spray Polyurethane Foam Applicators and Helpers	572
<i>Theresa Lucado</i>	
CPI Product Stewardship Literature Outreach to the Spray Polyurethane Foam Industry. The Most Up to Date EH&S Information Which is On Line and Available!	578
<i>William Robert, Cynthia Graham</i>	

PROCESSING INNOVATIONS

Next Generation of PU Injection Equipment with Low Pressure	581
<i>Christian Decker, Bjoern Dormann</i>	
Processing Reinforced and Filled Polyurethanes	587
<i>Richard Werner</i>	
New Developments in Mixhead and Injector Technology for High Pressure Polyurethane Applications	602
<i>John Tolley, Lutz Heidrich</i>	
Graco Advancements in Single-Component Precision Dispense and Shot Metering Technology	612
<i>Dave Behrens, Nick Didonato</i>	

RENEWABLE POLYOLS 1: CHEMISTRY

Scientific Approach to the Question "Why Natural Oil Based Polyols Affect the Physical Properties of Conventional Slabstock Foam?"	620
<i>Annegret Terheiden, Roland Hubel</i>	
Development of Ligno-Polyol for the Production of Polyurethanes	631
<i>Minh Tan Ton-That, Tri-Dung Ngo, Thomas Lebarbé, Christian Bélanger, Wei Hu, Behzad Ahvazi, Jalal Hawari, Fanny Monteil-Rivera, Adrien Pilon, Armand Langlois</i>	
Susterra® Propanediol - Renewability, Sustainability, and Differentiating Performance in Urethane Applications	640
<i>Judith Van Gorp, Joseph Desalvo, Robert Miller</i>	
Processing and Performance Comparison of Soybean Oil Based Polyol in Flexible Foam Application	653
<i>Munjali Patel, Nathan Hofstadter</i>	
Polyether Polyols Produced From Scrap Polyurethanes - Application in Rigid and Flexible Foams	657
<i>Ibrahim Sendijarevic, Jordan Harris, Stephen Hoffman, Senad Heric, Niral Lathia, Vahid Sendijarevic</i>	

RENEWABLE POLYOLS 2: APPLICATIONS

High Performance Natural Oil Based Polyols for Flexible Molded Polyurethane Foams	668
<i>Atsushi Miyata, Kanae Morishita, Shinsuke Matsumoto</i>	
A New Versatile High Renewable Content Based Polyol for the Production of Multiple Flexible Slabstock Foam Technologies	679
<i>William Gower</i>	
Polycard™ XFN, A Novel Class of Bio-Based Polyols for Rigid Foam Formulations	691
<i>James Weir, Pietro Campaner, Elena Benedetti</i>	
A Life Cycle Update of Soybean and Petroleum Based Polyols	696
<i>James Pollack, Anne Landfield Greig</i>	

SPORTS AND ATHLETIC FOOTWEAR

Strata Sport®: An Innovative Environmentally Friendly Synthetic Sport Surface	702
<i>David Schulte, Richard Wagner, Ulrich Holeschovsky, Mark Vanover, David Witt, Randall Niese, Bill Hayden</i>	
Modern Type of Manufacturing Equipment for the Production of Cup Sole Athletic Footwear	708
<i>Christian Decker, Bjoern Dormann</i>	
New Polyurethane Elastomers with Increased Bio-renewable Content for Footwear Applications	713
<i>Daniel Rosenvasser, Jim McCloud, Lan Cao, Rafael Camargo</i>	
Automation of Assembly Footwear Production by the Use of Reactive Hotmelt and Other Robotic Solutions	728
<i>Christian Decker, Bjoern Dormann</i>	
PU Footwear Production: Extreme Low Labour Cost or Full Automation - Which Will Be the Winner?	734
<i>Steve Lee</i>	

SUSTAINABILITY

Technical Feasibility, Cost Effectiveness and Practicality of Managing ODS-Containing Foams at End-of-Life	740
<i>Paul Ashford, Arnie Vetter</i>	
Carbon Credits Via End-of-Life Foam Disposal	749
<i>Jeff Cohen</i>	
Author Index	