

**185th Technical Meeting and
Educational Symposium of the
Rubber Division, American
Chemical Society 2014**

**Louisville, Kentucky, USA
24 - 26 March 2014**

ISBN: 978-1-63266-313-9

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© (2014) by the Rubber Division, ACS
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the Rubber Division, ACS
at the address below.

Rubber Division, ACS
PO Box 499
Akron, OH 44309-0499

Phone: (330) 972-7814
Fax: (330) 972-5574

rctassistant@rubberdivision.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

Monday, March 24 – Regency Ballroom North, 2nd Floor

CONTRIBUTED SESSION ON POLYMERS AND ADHESIVES

Chair: **C. Jeffrey Lin, Momentive Performance, Inc.**

- 8:30 a.m. HT-ACM & XT-ACM Heat and Fluid Resistant Acrylic Rubber – **H. Martin Issel**, Unimatec Chemicals America, Inc. 1
- 9:00 a.m. Chemical Aspects in Aging of NBR and HNBR-Materials – **Ulrich Giese**, Deutsches Institut für Kautschuktechnologie e. V., Germany 17
- 9:30 a.m. Break
- 9:45 a.m. Using Dithiodicaproduct Accelerator to Reduce Reversion and Improve Heat Aging Properties in Natural Rubber, Polybutadiene and Other Unsaturated Polymers – **Steven Monthey**, Rhein Chemie Corp. 31
- 10:15 a.m. An Engineer's Guide to Selecting Rubber-to-Substrate Adhesives – **Emmanuel Pitia**, Lord Corporation 42

11:00 a.m. KEYNOTE ADDRESS (Open To All Attendees)

Sustainable Development - A Major Challenge to the Rubber Industry



P.K. Mohamed, Chief Advisor – Research & Development, Apollo Tyres Ltd.

P.K.Mohamed is the Chief Advisor of Research and Technology of Apollo Tyres Ltd. He is directly responsible for all R&D activities of CV tyres, which include Raw Materials, TBR, TBB and OHT (Radial & bias) of the company. Mohamed is a Fellow member of the Rubber and Plastic Institute London, a member in the Management Board of Apollo Tyres Ltd, Industrial Advisory board of CenTire, IRCO and Area Director of American Chemical Society, Rubber Division. Mohamed is a past Chairman of Indian Tyre Technical Advisory Committee (ITTAC) and Indian Rubber Institute. Mohamed closely works with academic institutions and has served as a member of board of studies of Cochin University of Science & Technology.

ADVANCES IN RUBBER SCIENCE AND TECHNOLOGY

Chair: **Ed Terrill, Akron Rubber Development Laboratory**

- 1:30 p.m. Multi-Scale-Level Simulations for Filler-Filled Rubbers Using Coarse-Grained Model – **Hiroshi Morita**, National Institute of Advanced Industrial Science and Technology (AIST), Japan
- 2:00 p.m. Finite Element Simulation of Time-Dependent Effects Using a Microstructure-Based Model for Filled Elastomers – **Rathan Raghunath**, German Institute of Rubber Technology (DIK), Germany
- 2:30 p.m. Investigation of the Temperature and Pressure Dependence of the Friction Properties of Elastomers on Rough Self-Affine Surfaces – **Andrej Lang**, German Institute for Rubber Technology (DIK), Germany
- 3:00 p.m. Break
- 3:15 p.m. Viscoelastic Properties of Elastomer-Resin Blends and Relevance to Tire Tread Performance – **Christopher Robertson**, Eastman Chemical Company
- 3:45 p.m. Preparation and Properties Study of Renewable Rubber Composites Based on Itaconic Acid and Natural Fillers – **Runguo Wang**, Beijing University of Chemical Technology, China

Tuesday, March 25 – Regency Ballroom North, 2nd Floor

ADVANCED ANALYTICAL CHARACTERIZATION OF RUBBER COMPOUNDS

Chair: J. Cal Moreland, Michelin North America, Inc.

- 9:00 a.m. Effect of Crosslinking Junctions as a Molecular Singularity Point on Mechanical Properties – **Oraphin Yamamoto**, National Metal and Materials Technology Center (MTEC), Thailand
- 9:30 a.m. Investigating the Rheological Behavior in Highly Filled SBR Using a Moving Die Rubber Process Analyzer – **John D.M. Shearer**, Center for High-rate Nanomanufacturing
- 10:00 a.m. AM Influence of Carbon Black Properties on the Surface Appearance of Extruded Articles – **Michael Warskulat**, Germany and **Bernhard Schwaiger**, Orion Engineered Carbons GmbH, Germany
- 10:30 a.m. Break
- 10:45 a.m. Application of an Advanced TGA-GC-MS Coupling for the Characterization of an NR/SBR Rubber Mixture – **Tais Doll**, NETZSCH Instruments N.A. LLC
- 11:15 a.m. Heterogeneity and Heat Aging Effect Seen in Rubber Vulcanizates Investigated By Nano-Palpation AFM – **Ken Nakajima**, Tohoku University, Japan

SCIENCE & TECHNOLOGY AWARD WINNERS

Chair: Maria D. Ellul, ExxonMobil Chemical Co.

- 2:15 p.m. Rubber Contact Phenomena - **Goodyear Medalist Winner** – **Dr. Alan D. Roberts**, Tun Abdul Razak Research Centre, United Kingdom
- 3:15 p.m. Prediction and Simulation of Tire Performance Using “Deformation Index” - **Melvin Mooney Distinguished Technology Award Winner** – **Dr. Shingo Futamura**, Material Science and Engineering
- 3:45 p.m. Network Evolution in Elastomers at Large Deformations and Elevated Temperatures: Experiments and Modeling - **George Stafford Whitby Award for Distinguished Teaching and Research Winner** – **Dr. Alan Wineman**, University of Michigan
- 4:15 p.m. Break
- 4:30 p.m. Nanomatrix Structure of Natural Rubber - **Sparks-Thomas Award Winner** – **Dr. Seiichi Kawahara**, Nagaoka University of Technology, Japan
- 5:00 p.m. Adventures in Dynamically Vulcanized TPEs - **Chemistry of Thermoplastic Elastomers Award Winner** – **Dr. Charles Radar**, Advanced Elastomer Systems, L.P. (retired)
- 5:30 p.m. Development of the Moving Die Rheometer and the Rubber Process Analyzer - **Fernley H. Banbury Award Co-Winner** – **Henry A. Pawlowski**, Alpha Technologies U.S.
- 5:50 p.m. Evolution of RPA Test Methodologies for the Rubber Industry - **Fernley H. Banbury Award Co-Winner** – **John S. Dick**, Alpha Technologies U.S.

Wednesday, March 26 – Regency Ballroom North, 2nd Floor

POLYMER SYNTHESIS AND FUNCTIONALIZATION OF POLYMERS

Co-Chairs: Roderick P. Quirk, The University of Akron, Rudolf Faust, University of Massachusetts

Lowell, Sergio Corona-Galvan, Dynasol Elastomers

- 8:15 a.m. Polymer Electrolyte Membrane with Nanomatrix Channel Prepared By Sulfonation of Natural Rubber Grafted with Polystyrene – **Yoshimasa Yamamoto**, Tokyo National College of Technology, Japan
- 8:45 a.m. In-Chain Functionalized Polybutadiene – **Tang Wong**, Goodyear Tire & Rubber Company
- 9:15 a.m. Influence of SSBR Microstructure on Silica Mixing & Compound Performance – **Judy E. Douglas**, LANXESS Corporation and **Howard Colvin**, Cooper Tire & Rubber Co.
- 9:45 a.m. Break
- 10:00 a.m. Well-Defined Polyethylenes and Polyethylene-Based Block Copolymers By Anionic Polymerization and Polyhomologation – **Nikos Hadjichristidis**, King Abdullah University of Science and Technology (KAUST), Saudia Arabia
- 10:30 a.m. Practical Anionic Synthesis of In-Chain Functional Polymers By Homo- and Copolymerization of P- Dimethylsilylstyrene with Styrene – **Roderic P. Quirk**, Department of Polymer Science, Institute of Polymer Science and Polymer Engineering, The University of Akron
- 1:00 p.m. Two-state Living Coordination Polymerization for Scalable Production – **Lawrence R. Sita**, University of Maryland
- 1:30 p.m. Effects of Catalyst Concentration on the Structure, Morphology and Mechanical Properties of Polyisobutylene-based Thermoplastic Polyurethanes – **Rudolf Faust**, University of Massachusetts Lowell
- 2:00 p.m. Design, Synthesis and Properties of All-Bio-Based and Processable Elastomer from Epoxidized Soybean Oil – **Zhao Wang**, Beijing University of Chemical Technology, China, China

**Visit rubber.org/technical-program for more information
about our presenters and award winners.**