12th Fall - Rubber - Colloquium
November 22 - 24, 2016

Deutsches Institut für Kautschuktechnologie e.V.
Scientific Program
Tuesday, November 22, 2016

Opening ceremony

11:00  U. Giese

11:10  D. Behrens
       Ministry for Economics, Labour and Transports

11:40  M.-J. Wang
       EVE Rubber Institute
       *Filled rubber versus gum*

12:15  M. Galimberti
       Politecnico di Milano
       *Carbon allotropes as reinforcing fillers: anisotropy, synergy, reinforcement predictivity, chemical reactivity*

12:45  LUNCH
Tuesday, November 22, 2016

Session 1
Elastomer Chemistry
Chairperson: A. Blume

13:45 K. Krause
Deutsches Institut für Kautschuktechnologie e.V.
Influence of Coagent/Peroxide Systems on the
Crosslinking of Special-Purpose Types of Rubber
with optimized Physical Properties

Session 2
Elastomer Physics
Chairperson: T. Alshuth

14:00 A. Malsak
Deutsches Institut für Kautschuktechnologie e.V.
High Frequency Investigation of Filled and Unfilled
Elastomers using Ultrasonic Spectrometer

14:20 B. Janowski
Synthos S.A.
Study on functionalization of solution-SBR by oligo-
siloxanes having alkoxyisilyl side groups

14:50 R. Hickmann
TU Dresden, Institute of Textile Machinery and High
Performance Material Technology
Adhesion Enhancement of PPS-Polymer composites

Session 3
Rheology
Chairperson: E. Habestrosch

14:00 M. Wilhelm
Karlsruhe Institute of Technology
Fourier-Transform Rheology of Unvulcanized, Car-
bon Black Filled SBR

14:20 F. S. Grasso
Versalis S.p.A., Elastomer Research Center
Revisiting capillary rheometry characterization of
raw rubber in short dies

14:50 I. A. Morozov
Institute of Continuous Media Mechanics UB RAS
Structural-mechanical AFM study of cracks and
defects on surface of natural rubber vulcanizates

15:20 M. Ludwig
Deutsches Institut für Kautschuktechnologie e. V
Lifetime Prediction of Elastomers based on Quantitative
Analysis of Filler Particle Size Distribution

15:25 COFFEE BREAK
### Tuesday, November 22, 2016

#### Session 1
**Elastomer Chemistry**  
Chairperson: A. Blume

| 15:55   | S. David  
ARLANXEO Deutschland GmbH  
*Creating a model for novel polymer developments based on solubility parameters* |

| 16:30 | J. López Valentin  
Institute of Polymer Science and Technology (ICTP-CSIC)  
*Ionic Elastomers with Shape-Memory properties: Influence of counter-ions on the switching thermal transition.* |

| 17:05 | M. Gruendken  
Kuraray Europe GmbH  
*Liquid Rubber as EPDM Modifier in Peroxide Curing Systems* |

#### Session 2
**Elastomer Physics**  
Chairperson: T. Alshuth

|  | S. Seichter  
TU Wien, Institute for Materials Science and Technology  
*A study on the fatigue behaviour of industrial rubbers and rubber composites with pure-shear specimen* |

|  | D. M. Paulkowski  
Fraunhofer-Institut für Fertigungstechnik und Angewandte Materialforschung IFAM  
*Rapid wear testing on coated elastomers using model test rig* |

|  | M. Salehi  
University of Twente, Department of Elastomer Technology and Engineering  
*Prediction of tire dry grip by using the Laboratory Abrasion Tester (LAT) 100* |

#### Session 3
**Rheology**  
Chairperson: E. Habe livestock

|  | G. Nijman  
Harburg-Freudenberger Maschinenbau GmbH  
*A rheologically optimized extrusion line for tyre components* |

|  | M. Heinz  
Evonik Resource Efficiency GmbH  
*Characterization of summer tire tread compounds by Large Amplitude Oscillating Shear (LAOS)* |

|  | T. Gebauer  
SIGMA Engineering GmbH  
*High-pressure capillary rheometer, Accuracy of established measuring techniques* |

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**Following the lectures**

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**POSTER SESSION**
Wednesday, November 23, 2016

**Session 1**
Simulation & Modelling  
Chairperson: J. Ihlemann

- **09:00**  
  J. Gogolin  
  ContiTech AG, CT Engineering, Advanced Simulations  
  *Cure kinetics model for NR and SR compounds*

- **09:35**  
  H. Baaser  
  University of Applied Sciences Bingen  
  *Training of Artificial Neural Networks in Compound Development - A new Study on Determination of Accuracy*

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**Session 2**
Nanocomposites  
Chairperson: S. Kawahara

- **09:00**  
  W. Wu  
  Beijing University of Chemical Technology, State Key Laboratory of Organic-Inorganic Composites  
  *Design and preparation of high performance elastomer composites used as seismic-protection isolators*

- **09:35**  
  Y. Zhou  
  University of Technology, Nagaoka, Department of Materials Science and Technology, Faculty of Engineering  
  *Preparation and properties of natural rubber with silica nanomatrix structure*

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**Session 3**
Rubber Friction & Physics  
Chairperson: M. Klüepel

- **09:00**  
  J. Jungk  
  Freudenberg New Technologies SE & Co. KG  
  *Looking deep into polymer structures - Potential applications for Dielectric Relaxation Spectroscopy in rubber evaluation*

- **09:35**  
  A. Serghei  
  Université Claude Bernard Lyon, Ingénierie des Matériaux Polymères  
  *Coupled mechanical-electrical investigations on elastomeric composite materials*

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**10:05**  
**COFFEE BREAK**

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**10:35**  
P. Westervoß  
TU Dortmund, Institute of Applied Mathematics (LS III)  
*Evaluation of nonlinear differential models for the simulation of polymer melts*

- **11:05**  
  M. M. Jacobi  
  Universidade Federal do Rio Grande Do Sul, Instituto de Química  
  *Properties of High Performance Rubbers Reinforced by carbon based nanofillers*

- **11:10**  
  B. Hernández Gascón  
  ITAINNOVA – Aragon Institute of Technology  
  *Finite element simulation of the rubber mechanical behaviour due to thermal ageing at high temperatures*

- **11:45**  
  T. Takagi  
  University of Technology, Nagaoka, Department of Materials Science and Technology, Faculty of Engineering  
  *Wet-masterbatch procedure for the preparation of natural rubber with organoinorganic nanomatrix structure*

- **11:45**  
  S. Celke  
  TU Chemnitz, Faculty of Mechanical Engineering, Professorship of Solid Mechanics  
  *Simulation of rubber components with regard to strain induced softening and dynamic stiffening*

- **11:45**  
  I. Hudec  
  Slovak University of Technology  
  *Elastomeric magnetic composites with shielding properties*

- **12:15**  
  C. Wrana  
  Rex Articoli Tecnici S. A.  
  *Crystallization of elastomers – A novel method for the characterization of the crystallization kinetics*

- **12:15**  
  D. Willenborg  
  TU Bergakademie Freiberg - Institute for Machine Elements, Design and Manufacturing  
  *Wave propagation and damping in natural rubber – steel-interfaces of suspensions*

- **12:15**  
  J. Plagge  
  Deutsches Institut für Kautschuktechnologie e.V.  
  *Quantification of strain induced crystallization by thermo-mechanical analysis*

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**12:15**  
**LUNCH**
Wednesday, November 23, 2016

 Session 1  
 Elastomer Chemistry  
 Chairperson: I. Hudec  
 13:15  
 M. van Duin  
 ARLANXEO Holding B. V.  
 Rationalising EPDM rubber compound data via master curves: not only practical but also enhanced understanding

 13:50  
 K. Sae-heng  
 University of Technology, Nagaoka, Department of Materials Science and Technology  
 Latex-state NMR spectroscopy for quantitative analysis of epoxidized deproteinized natural rubber

 14:25  
 A. Kömmling  
 Bundesanstalt für Materialforschung und -prüfung (BAM)  
 Ageing and lifetime prediction of O-ring seals made of HNBR, EPDM and FKM

 15:00  
 T. Förster  
 Wehrwissenschaftliches Institut für Werk- und Betriebsstoffe (WIWeB)  
 High Resolution Concentration Profiles of Aged Elastomers

 Session 2  
 Reinforcement & Fillers  
 Chairperson: M. Jacobi  
 13:15  
 J. W. Noordermeer  
 University of Twente, Elastomer Technology and Engineering  
 Constant-strain vs. constant-stress based time-temperature superposition of viscoelastic mastercurves for silica-reinforced tyre tread compounds

 14:25  
 I. Guy  
 Solvay Silica  
 High Surface Area Silica with Natural Rubber based compounds: Impact of the silane reactivity and the crosslinking density on the compromise in term of energy dissipation and wear mechanism

 15:00  
 J. Meyer  
 University of Wuppertal  
 Molecular simulation approach to the prediction of mechanical properties of silica reinforced rubbers

 Session 3  
 Nanocomposites  
 Chairperson: M. Galimberti  
 13:15  
 J. G. Meier  
 ITAINNOVA – Aragon Institute of Technology  
 On the action of synthetic layered silicates additives as filler network modifier in tire tread mixtures

 13:50  
 A. Kampf  
 J. Rettenmaier & Söhne GmbH + Co. KG  
 ARBOCEL® for rubber applications – cellulose fiber with special functionality

 14:25  
 C. W. Karl  
 Fakultät für Bauingenieurwesen und Geodäsi, Leibniz-Universität Hannover  
 Structure-property relationships of SBR composites

 15:00  
 A. Pazat  
 Laboratoire de Recherches et de Contrôle du Caoutchouc et des Plastiques (LRCCP)  
 Chemical Modification of Graphite Oxide Sheets and Their Uses in Elastomer Nanocomposites

 15:30  
 COFFEE BREAK

 Session 4  
 16:00  
 B. Nelson  
 Zeon Europe GmbH  
 High Performance HNBR (HP-Zetpol®): New Opportunities for Sealing Applications - Improvements in Compression Set, Long Term Aging and Processability

 16:35  
 Y. Iwase  
 Chemicals Evaluation and Research Institute  
 Ozone degradation of vulcanized isoprene rubber as a function of humidity

 17:10  
 N. Meissner  
 Synthos S.A  
 The properties of model tire tread compounds based on functionalized SSBR containing oligosiloxy groups

 Session 5  
 16:00  
 J. Muller  
 Nanocyl S.A.  
 Release assessment from matrix containing-MWCNT along the lifecycle

 16:35  
 F. Gruner  
 Evonik Resource Efficiency GmbH  
 Prediction of in-rubber dispersibility of silica by analytical methods

 17:10  
 N. Vleugels  
 University of Twente, Elastomer Techn. and Engi.-Understanding the behavior of the coupling agents TESPT and Si 363 in short-cut aramid fiber reinforced elastomers

 Session 6  
 16:00  
 S. Kawahara  
 Nagaoka University of Technology  
 Effect of minor constituents on the mechanical properties of natural Rubber

 16:35  
 W. Wu  
 Beijing University of Chemical Technology  
 Study on Structure and Property of Aramid Pulp Filled CR Composites

 17:10  
 M. C. V. Omelan  
 Deutsches Institut für Kautschuktechnologie e. V.  
 Development of PDMS/CNT composites for neuro-medical application

 19:00  
 SOCIAL EVENT
Thursday, November 24, 2016

Session 1
Elastomer Chemistry
Chairperson: M. van Duin

09:00  X. Minghan
Deutsches Institut für Kautschuktechnologie e. V.
Influence of water on dynamic mechanical properties of silica loaded tire tread vulcanizates

09:35  Y. Aoyagi
Freudenberg New Technologies SE & Co. KG
Study on aging process of rubber material for sealing applications

Session 2
Elastomer Physics
Chairperson: J. Meier

K. Narynbek Ulu
Research Institute GeM
Fatigue life of unaged HNBR blends tested at high temperature

T. Kroth
Fraunhofer Institute for Structural Durability and System Reliability LBF
A concept for temperature-dependent fatigue prediction of elastomer components

Session 3
Network Characterisation / Cross-linking
Chairperson: H. Geisler

A. Das
Tampere University of Technology
Development of Reversible Network of Commercial Rubbers

B. Basterra Beroiz
Goodyear Innovation Center Luxembourg
New insights into rubber network structure by a combination of experimental techniques

10:05  COFFEE BREAK

Session 1

10:35  M. Jaunich
Bundesanstalt für Materialforschung und -prüfung (BAM)
Low temperature properties of elastomer seals - Comparison between purely static and partially released seals -

11:05  C. Gögelein
ARLANXEO Deutschland GmbH
Morphology and mechanical properties of reinforced and crosslinked EPDM rubber blends

11:45  E. Jourdain
ExxonMobil Chemical Europe Inc.
High Molecular Weight Vistalon™ EPDM grades for broad selection of applications

Session 2

10:35  C. Lenges
DuPont Industrial BioScience
Engineered Polysaccharides as Renewable Reinforcing Filler in Rubber Composites

11:05  J. Vuorinen
Tampere University of Technology, Department of Materials Science
Vegetable additives for dielectric elastomers

11:45  R. Diaz
University of Nantes, REP International
The role of processing parameters in an industrial thermo-mechanical devulcanization process

Session 3

10:35  V. Boerger
Schill+Seilacher “Struktol” GmbH
New Processing Additives For The Compounding Of Special Elastomers

11:05  N. Rennar
University of Applied Sciences, Plastics and Rubber Technology
Unusual Polymer Networks and their Rubber Elastic Properties, Theory - Experiment - Applications

11:45  I. Chodak
Polymer Institute of the Slovak Academy of Sciences
The effect of mechanical deformation on the structure of carbon black physical network determined by electrical conductivity of the vulcanized rubber mixture

12:15  LUNCH
## Thursday, November 24, 2016

### Session 1
**Reinforcement & Characterization**
Chairperson: J. W. M. Noordermeer

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Institution</th>
<th>Presentation Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:15</td>
<td>J. López Valentin</td>
<td>Institute of Polymer Science and Technology (ICTP-CSIC)</td>
<td>Advanced Characterization of Filler-Rubber Interactions by Using Time-Domain NMR</td>
</tr>
<tr>
<td>13:50</td>
<td>M. Wunde</td>
<td>Deutsches Institut für Kautschuktechnologie e.V.</td>
<td>Tearing energy in filler reinforced elastomers for tire treads</td>
</tr>
<tr>
<td>14:25</td>
<td>A. Blume</td>
<td>Evonik Industries AG - Inorganic Materials-Rubber Technology</td>
<td>Infrared Study of the Silica / Silane Reaction - influence of Different Probe Molecules</td>
</tr>
<tr>
<td>15:00</td>
<td>H. Westenberg</td>
<td>Orion Engineered Carbons GmbH</td>
<td>Advanced characterization of filler dispersion by using a confocal light microscope for improved wear resistance</td>
</tr>
</tbody>
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### Session 2
**Processing**
Chairperson: B. Klie

<table>
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</tr>
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<tbody>
<tr>
<td>13:50</td>
<td>F. Lemke</td>
<td>RWTH Aachen University, Institute of Plastics Processing (IKV)</td>
<td>Analysis of the efficiency of continuous vulcanisation</td>
</tr>
<tr>
<td>14:25</td>
<td>S. Schäfer</td>
<td>RWTH Aachen University, Institute of Plastics Processing (IKV)</td>
<td>Development of an extrusion die for the continuous pre-cross-linking of solid silicone rubber</td>
</tr>
<tr>
<td>15:00</td>
<td>S. Teich</td>
<td>Deutsches Institut für Kautschuktechnologie e. V.</td>
<td>The logarithmic torque as a function of the reciprocal melt temperature – Evaluating rubber mixing quality for internal mixer processes on different aggregate sizes</td>
</tr>
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### Session 3
**Simulation & Modelling**
Chairperson: N. Kregel

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<tr>
<td>13:15</td>
<td>J. Ihlemann</td>
<td>TU Chemnitz, Faculty of Mechanical Engineering</td>
<td>Identification of inelastic material parameters using component-oriented specimen</td>
</tr>
<tr>
<td>13:50</td>
<td>N. Heinrich</td>
<td>TU Chemnitz, Faculty of Mechanical Engineering</td>
<td>Volumetric finite Element Models for textile reinforced Rubber components</td>
</tr>
<tr>
<td>14:25</td>
<td>M. Itskov</td>
<td>RWTH Aachen University, Department of Continuum Mechanics</td>
<td>Mechanics of rubber composites based on polymer chain length statistics</td>
</tr>
<tr>
<td>15:00</td>
<td>Khiem Ngoc Vu</td>
<td>RWTH Aachen University, Department of Continuum Mechanics</td>
<td>Physically-based constitutive modeling of rubber-like materials</td>
</tr>
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### Closing Remarks

15:30
We thank all sponsors for their support

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