

Conference Report II

German Society of Rheology

(DRG)

Annual Meeting of the German Rheological Society “Recent Trends in Fundamental and Applied Rheology”

BERLIN, GERMANY, MARCH 31 AND APRIL 1, 2011

In this year, the Annual Meeting of the German Rheological Society (DRG) was devoted to “Recent Trends in Fundamental and Applied Rheology.” Around 70 scientists working in the field of rheology and processing joined the conference which took place at the BAM Federal Institute for Materials Research and Testing in Berlin on March 31 and April 1.

The President of the DRG, Professor Norbert Willenbacher (KIT Karlsruhe), opened the conference with a welcome. Then Professor Matthias Ballauff (Helmholtz-Center for Materials and Energy, Berlin) presented new results on start-up experiments of a concentrated, non-crystallizing suspension of thermosensitive colloids. The results of these experiments were compared with predictions of the mode-coupling theory and simulations. The viscoelastic and structural properties of colloidal systems were the topics of two lectures of Günter Auernhammer and Marcel Roth (Max-Planck-Institute for Polymer Research Mainz). The microrheological experiments (e.g., nanoindentation tests) give much insight into the structural and dynamical response on different length scales. Claude Oelschlaeger (KIT Karlsruhe) investigated the viscoelastic properties of mixed wormlike micelles of cationic surfactants. The Quartz-rheometer-technique allows one to perform shear oscillations up to the MHz range. The application of this technique to the determination of the entanglement relaxation time was discussed by Robert Vogt (Freiburg Materials Research Center, University of Freiburg i. Br.). Michael Kempf (KIT Karlsruhe) established correlations between flow properties and molecular architecture. He showed how Fourier transformation rheology can be applied in order to establish such structure-properties relations. New insights into rheology and processing of polypropylene were presented by Saeid Kheirandish (Borealis Polyolefine GmbH, Linz).

The afternoon session of the DRG conference was dedicated to Professor Joachim Meißner (ETH Zürich) who passed away on January 7, 2011. Professor Manfred Wagner mentioned in an obituary the scientific stations and contributions to the field of rheology by Professor Meißner. An invited lecture was given by Professor Ole Hassager (Technical University of Denmark). He thoroughly discussed the extensional rheology of polymer melts using the technique of filament stretching rheometry. An important issue of experimental elongational rheometry is the homogeneity of deformation. This question and recent approaches were discussed by Teodor Burghelea (University of Nantes). The viscoelastic and electrical properties of polycarbonate composites which were filled with carbon nanotubes were the subject of the lecture of Ulrich Handge (Polymer Engineering, University of Bayreuth). The addition of carbon nanotubes to polycarbonate strongly reduces the recoverable deformation in melt extension.

Theoretical and experimental investigations on the enhancement of strain-hardening by thermo-oxidative treatment of low-density polyethylene were carried out by Victor Rolón-Garrido (Technical University of Berlin). He applied the molecular stress function model which is in close agreement with experimental data. The rheological properties in elongation are also relevant for polymer solutions. CaBER experiments allow one to study these systems in detail which was shown by Oliver Arnolds (KIT Karlsruhe) for, e.g., polyethyleneoxide solutions and different polydimethylsiloxane grades. The award of the German Rheological Society is bestowed every two years. In this year, Ute Keßner (University of Erlangen-Nürnberg, now BASF Coatings, Münster) received this award. In her lecture, she presented the main results of her PhD dissertation which was devoted to the influence of molecular architecture and long chain branching on the thermorheological behaviour of polyolefins.

In the beginning of the second day of the conference, Professor Corneliu Balan (University Politehnica of Bucharest) presented his methods for the rheological characterization of yields stress flu-

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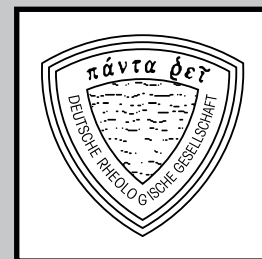
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ids in an invited lecture. He showed how large oscillatory amplitude shear oscillations can be applied in order to detect the critical yield stress. The elongational flow properties play a key role for dispending viscoelastic solutions. This topic was convincingly demonstrated by Professor Christian Clasen (University of Leuven). The linear viscoelastic properties of suspensions of multi-walled carbon nanotubes in ionic liquids were discussed in the lecture of Yasmin Korth (Freiburg Materials Research Center, University of Freiburg im Breisgau). In an illustrative lecture, she discussed the influence of polarity of the solvent and the size of the anions on the rheological properties of these suspensions. The lecture of Professor Henning Winter (National Science Foundation and University of Amherst) was devoted to the rheological patterns of physical gelation. He elucidated the basic physical mechanisms by discussing his results on polymer/clay nanocomposites. In the subsequent lecture, Teodor Burghilea discussed the solid-fluid transition in a physical gel. A profound analysis of the viscoelastic properties of galactomannans derived from legume endosperms of genus sesbania was performed by Peter Fischer (ETH Zürich). Small-angle-scattering techniques can be combined with rheological methods. Such Rheo-SAS techniques were demonstrated in an illustrative lecture by Jörg Läger (Anton Paar Germany GmbH, Ostfildern).

In the first lecture after the lunch break, Deepak Ahirwal (KIT Karlsruhe) showed that Fourier transformation rheology can be also applied in order to characterize polystyrene melts and its blends. The method of multi particle tracking (MPT) is a powerful tool in order to study structural and viscoelastic properties of highly elastic acrylic thickener solutions. Anne Kowalczyk (KIT Karlsruhe) applied and discussed this technique in detail. Viscoelasticity and melt chromatography by new linear principle was the title of the lecture of Tommi Borg (TomCoat Oy, Evijärvi) who applied control theory to model the viscoelastic properties. Finally, Patrick Degen (University of Dortmund) discussed the influence of particle/surfactant interactions on the interfacial rheology.

In summary, a very stimulating conference which covered a large number of different topics took place in Berlin. The next meeting of the German Rheological Society will be jointly organized with the German Physical Society (DPG). It will take place in March 2012 in Berlin at the DPG conference of the Condensed Matter Division.

Ulrich A. Handge



*Figure 1 (above):
The Annual Meeting of the German Rheological Society took place at the BAM Federal Institute of Materials Research and Testing in Berlin (Photography by Ulrike Rockland, BAM Federal Institute for Materials Research and Testing).*



*Figure 2:
Ute Keßner received the award of the DRG in 2011. From right to left: C. Wagner, C. Marotzke, U. Keßner, C. Balan, N. Willenbacher, O. Hassager, and U. Handge (Photography by Lothar Buchta, BAM Federal Institute for Materials Research and Testing).*