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Detailed Programme

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OC6-16 Advanced thermal analysis solutions - HyperDSC, UV-DSC, UV-DMA, and Raman-DSC
measurements to characterize polymeric materials
Iris Plathaus, Svenja Goth

OC6-17 FTIR-ATR monitoring and SEC/RI/MALLS characterization of ATRP synthesized hyperbranched polycrylates
Miguel Goncalves, Mário Rui Costa, Rolando Dias

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OC6-3 Polymerization Methods to obtain Amino-Functionalized Biocides
Elisabeth Kreutzwiesener, Frank Wiesbrock, Christian Slugovc, Franz Stelzer

OC6-4 Microwave-assisted nitroxide-mediated polymerization in aqueous solution: effectiveness of the
irradiation mode
Julien RIGOLINI, Laurent BILLON, Bruno GRASSL

OC6-5 Microwave-assisted synthesis of ionic liquids - on the importance of internal temperature
monitoring in microwave chemistry
David Obermayer, Bernhard Gutmann, C. Oliver Kappe

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KL6-2 Microwave-assisted reactions: A powerful synthetic approach for polymerizations
Ulrich S. Schubert

Session 6A
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OC6-6 Power of Ion Mobility combined with High Resolution Mass Spectrometry for the Analysis of
Complex Polymer Samples
Matthew Kennedy, Diana Uria, J Kirkpatrick

OC6-7 Controlling the Critical Behavior of Paranematic to Nematic Transition in Liquid Single-Crystal
Elastomers
Andrija Lebar, George Cordoyanni, Zdravko Kutnjak, Brígida Rozić, Bostjan Zalar, Slobodan Zumer, Felicitas
Brommel, Simon Krause, Heino Finkelmann

OC6-8 Dielectric spectroscopy of ultrathin polymer layers: from supported to freely-standing films
Simone Napolitano, Cinzia Rotella, Michael Wübbenhorst

OC6-9 Rheology and GPC/SECComparing the Potential of Two powerful Techniques in Polymer Analysis
Gerhard Heinmann

OC6-10 Gas analysis during polydimethylsiloxane ageing
MADELEINE PERDRIILLAT Claire, De Sainte Claire Pascal, Delor-jezin Florence

OC6-11 Dynamic light scattering on highly swollen poly(acrylic acid) networks
Franziska Krohl, Volodymyr Boyko, Karl-Friedrich Arntz

Session 6B-KL
Monday, July 13, 16:30 - 17:30, LH 4: Lecture Hall 4
KL6-3 Successive Synthesis of Well-Defined Miktoarm Star-Branched Polymers by Iterative Methodology
Using Living Anionic Polymerization
Akira Hirao

KL6-4 Effect of segregation strength and molecular architecture on the crystallization of single or double
crystalline diblock copolymers and miktoarm star copolymers
Alejandro J. Müller

Session 6B
Monday, July 13, 17:30 - 18:30,
OC6-18 hydrodynamic and conformational properties of star-shape macromolecules
Alexander Filippov

OC6-19 Shielding Effects in Reactions between Star-Branched Polymers
Markus Gerd Fröhlich, Gerhard Zifferer
We report on solution properties of loosely grafted copolymers composed of poly styrene (PS) backbone (degree of polymerization of PS backbone, \( n = \times \)) and variable length of poly(tert-butyl methacrylate) (P(t-BuMA)) side chains (degree of polymerization of side chains, \( n = 6 \)). At fixed number of grafting sites \( n = 11 \) and polydispersity index \( M_w/M_n \) ranging from 1.05 to 2.63. Synthesis of these graft copolymers is based on a novel synthetic route involving two independent controlled/living polymerization mechanisms, namely nitroxide-mediated radical polymerization (NMP) for the synthesis of the backbone and photoinduced grafting from intes oner process for building of P(t-BuMA) branches. The viscosity-related contraction factors \( \chi < \) 1 confirmed high degree of branching of the studied graft copolymers. Dilute solutions of graft copolymers in non-solvent selective (THF), examined by dynamic light scattering (DLS), small- angle X-ray scattering (SAXS) and viscometry, revealed a transition from linear coil conformation through worm-like-stair to a micellar architecture under increasing number of monomeric units in side chains \( n < \). These data were further supported by the structure factors \( R_g/l \) and \( R_g/l \) obtained by independent measurements and extrapolated to infinite dilution. Persistence lengths of the samples exhibiting comb-like topology were larger compared to linear polystyrene backbone and P(t-BuMA) side chains In THF suggesting stiffening of the main chain with increasing size of the attached side chains. Unimolecular micelles were detected by DLS and SAXS in solvent selective for grafts in toluene.

OC6-15
Hydrodynamic analysis of well-defined linear macromolecules of low molar mass
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2Department of Polymer Chemistry, Linnaeus University, Norrköping 24, LT-03225, Linköping, Sweden.
3Department of Physics, Stockholm University, 10691 Stockholm, Sweden.
4Laboratory of Organic and Macromolecular Chemistry, Friedrich-Schiller-University, Jena, Humboldtstr. 10, 07743 Jena, Germany.

Samples of poly(styrene-diphenylethylene) copolymers of narrow molar mass distribution were studied by molecular hydrodynamic methods. The interference optics of the Beckman XL1 analytical ultracentrifuge for the study of the velocity sedimentation of the samples was used. All translation frictional values as well as the intrinsic viscosity were measured in toluene. The sedimentation data were treated with the Sedfit program which numerically solves the Lamm equation. The Sedfit program can determine both the velocity sedimentation coefficient and the frictional ratio. The latter parameter is unambiguously related to the translational diffusion coefficient. The adequacy of its determination by the Sedfit program was checked by an independent experimental determination of the translational diffusion coefficient. As a consequence, velocity sedimentation experiments evaluated by use of the Sedfit program may be considered as a self-sufficient method for the determination of molecular characteristics of linear polymers with narrow molar mass distribution. The recently developed Multi-HYDFFIT program performing a joint analysis of different transport properties of multiple samples allows the adequate estimation of conformational characteristics of short flexible chains without volume effects. This work also provides an adequate test of the ability of the recently developed Multi-HYDFFIT program for the joint analysis of different transport properties of multiple samples, coupled to the MC simulation results for the wormlike chains that improve the classical Yamakawa-Fuji theory of a first and successful application to the global methodology to short, synthetic oligomers reveals its interest beyond the typical polymeric structures to which it had been applied previously.

OC6-16
Advanced thermal analysis solutions – HyperDSC, UV-DSC, UV-DMA, and Raman-DSC measurements to characterize polymeric materials
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HyperDSC, a new DSC technique with fast scanning rates up to 750 °C/min which produces vastly increased sensitivity and permits analysis of materials without change due to annealing or re-crystallization phenomena. UV light sources coupled with powerful compensating differential scanning calorimetry (UV-DSC) and dynamic mechanical analysis (UV-DMA) have opened up new avenues for accurately characterizing isothermal photo-curing including gelation point, vitrification point, and cure kinetics. The examination of amorphous, melt, and semi-crystalline polymers is also presented which reveals a cutting edge pyrolytized technique to better understand multiphase polymer materials.

OC6-17
FTIR-ATR monitoring and SEC/RMALLS characterization of ATRP synthesized hyperbranched polycrystals
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In the last few years, controlled radical polymerization (CRP) techniques have been explored to produce hyperbranched polymers with improved homogeneity as compared to those obtained by conventional free radical polymerization (FRP). This work reports the synthesis at 1 L scale of hyperbranched polycrystals based upon acrylate/diacrylate monomers such as n-butyl acrylate (BA)/1,6-hexanediol diacrylate (HDDA) and using atom transfer radical polymerization (ATRP). A FTIR-ATR immersion probe was used to monitor the polymerization reaction. The dynamics of the build-up of polymer structure was studied by off-line analysis of samples at different reaction times by size exclusion chromatography (SEC) with detection of refractive index (RI) and multi-angle laser light scattering (MALLS) signals, leading to molecular weight distribution and 2-average radius of gyration. Kinetic measurements and observed parameters of the molecular architecture are compared with theoretical predictions which can be used to design new synthesis strategies to improve the homogeneity of hyperbranched polymers. Another goal of this study was elucidating the impact on polymerization of secondary reactions such as intramolecular cyclizations.