



THE SOCIETY OF RHEOLOGY

71ST ANNUAL MEETING PROGRAM

Monona Terrace
Madison, Wisconsin
October 17-21, 1999

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University of Michigan

Local Arrangements:

A. Jeffrey Giacomin
University of Wisconsin

Abstract Book Editor and Webmaster:

Albert Co, University of Maine

Meeting Schedule

Monday, October 18, 1999

8:30	W. H. Tuminello (PL1)			
9:20	Coffee			
9:45	SG1	IR1	FM1	LC1
10:10	SG2	IR2	FM2	LC2
10:35	SG3	IR3	FM3	LC3
11:00	SG4	IR4	FM4	LC4
11:25	SG5	IR5	FM5	LC5
11:50	Business Luncheon			
1:30	SG6	IR6	FM6	LC6
1:55	SG7	IR7	FM7	LC7
2:20	SG8	IR8	FM8	LC8
2:45	SG9	IR9	FM9	LC9
3:10	Coffee			
3:35	SG10	IR10	FM10	LC10
4:00	SG11	IR11	FM11	LC11
4:25	SG12	IR12	FM12	LC12
4:50	SG13	IR13	FM13	LC13
5:15	End			
7:00	Society Reception			

Tuesday, October 19, 1999

8:30	W. B. Russel (PL2)			
9:20	Coffee			
9:45	SG14	SL1	FM14	PM1
10:10	SG15	SL2	FM15	PM2
10:35	SG16	SL3	FM16	PM3
11:00	SG17	SL4	FM17	PM4
11:25	SG18	SL5	FM18	PM5
11:50	Lunch			
1:30	SG19	SL6	FM19	MS1
1:55	SG20	SL7	FM20	MS2
2:20	SG21	SL8	FM21	MS3
2:45	SG22	SL9	FM22	MS4
3:10	Coffee			
3:35	SG23	SL10	FM23	MS5
4:00	SG24	SL11	FM24	MS6
4:25	SG25	SL12	FM25	MS7
4:50	SG26	SL13	FM26	MS8
5:15	End			
5:30	Business Meeting			
7:00	Awards Reception			
8:00	Awards Banquet			

Wednesday, October 20, 1999

8:30	J. Mewis (PL3)			
9:20	Coffee			
9:45	BC1	HT1	SF1	MS9
10:10	BC2	HT2	SF2	MS10
10:35	BC3	HT3	SF3	MS11
11:00	BC4	HT4	SF4	MS12
11:25	BC5	HT5	SF5	MS13
11:50	Lunch			
1:30	BC6	HT6	SF6	MS14
1:55	BC7	HT7	SF7	MS15
2:20	BC8	HT8	SF8	MS16
2:45	BC9	HT9	SF9	MS17
3:10	Coffee			
3:35	BC10	HT10	GN1	MS18
4:00	BC11	HT11	GN2	MS19
4:25	BC12	HT12	GN3	MS20
4:50	BC13	HT13	GN4	MS21
5:15	End			
5:30	Poster Session & Refreshments			

Thursday, October 21, 1999

8:05	BC14	HT14	GN5	MS22
8:30	BC15	HT15	GN6	MS23
8:55	BC16	HT16	GN7	MS24
9:20	BC17	HT17	GN8	MS25
9:45	Coffee			
10:10	BC18	HT18	GN9	MS26
10:35	BC19	HT19	GN10	MS27
11:00	BC20	HT20	GN11	MS28
11:25	BC21	HT21	GN12	MS29
11:50	BC22	HT22	GN13	MS30
12:15	End			

Session Codes

BC = Blends and Block Copolymers
 FM = Non-Newtonian Fluid Mechanics
 GN = General Session
 HT = Heterogeneous Systems
 IR = Industrial Rheology

LC = Liquid Crystals and Liquid Crystalline
 Polymers
 MS = Rheology of Polymer Melts and Solutions
 PL = Plenary Lectures
 PM = Polymer/Particle Mixtures

SF = Shear-free Flows
 SG = Viscoelasticity of Synthetic and Biological
 Polymer Solutions and Gels
 SL = Rheology of Solids

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Plenary Lectures

8:30 AM Lecture Hall

- Monday, October 18** **Determining molecular weight distributions from the rheological properties of polymer melts**
William H. Tuminello
Central R. & D., The DuPont Company
- Tuesday, October 19** **Interpreting the rheology of dispersions in terms of time scales and forces**
Bingham Lecture
William B. Russel
Chemical Engineering, Princeton University
- Wednesday, October 20** **Effect of polymer coats on the rheology of stable and flocculated colloidal suspensions**
Jan Mewis
Chemical Eng., Katholieke Universiteit Leuven

Social Program

- Sunday, October 17** **Welcoming Reception**
7:00 PM - 10:00 PM Grand Terrace (4th floor)
Sponsored fully by TA Instruments
- Monday, October 18** **Business Luncheon**
12:00 Noon - 1:30 PM Grand Terrace
- Society Reception**
7:00 PM - 9:00 PM Community Terrace (2nd floor)
Sponsored partly by Rheometric Scientific, Inc.
- Tuesday, October 19** **Business Meeting**
5:30 PM Hall of Ideas
- Awards Reception**
7:00 PM Grand Terrace
Sponsored fully by Haake
- Awards Banquet**
8:00 PM Ballroom A-B
- Wednesday, October 20** **Poster Session Refreshments**
5:30 PM Grand Terrace
Sponsored partly by Paar Physica

Updates of Abstract Book

- **Paper LC3** (Monday, 10:35, Hall of Ideas J) has been modified. It should now read:

DYNAMICS OF SHEAR ALIGNING OF NEMATIC LIQUID CRYSTAL MONODOMAINS

Brett L. Van Horn¹, David Boudreau², and H. Henning Winter¹

¹Chemical Engineering, University of Massachusetts - Amherst, Amherst, MA 01003; ²Chemistry, University of Massachusetts - Amherst, Amherst, MA

The equations of linear and angular momentum for nematic liquid crystals have been described with Ericksen's transversely isotropic fluid (TIF) model and solved for start-up of shear flow at constant rate and varying initial alignment conditions. An analytical solution for the rotation provides predictions of the nematic director which closely agree with experimental results, supporting the validity of Ericksen's TIF model. The solution is limited to flows where the effects of director gradients are negligible. Experiments with polymeric systems are in progress.

- **Paper IR8** (Monday, 2:20, Hall of Ideas H) is replaced with:

RHEOLOGICAL CHARACTERIZATION AND PROCESSING OF RECYCLED POLYMERS

Ruifeng Liang and Rakesh K. Gupta

Department of Chemical Engineering, West Virginia University, Morgantown, WV 26506

Recycling of polymers is becoming increasingly important in order to protect the environment and minimize the use of virgin non-renewable resources. Although polymers can be recycled in many ways, material recycling back into the original application is the preferred technique. In this paper, we present our work on the rheological characterization of Polycarbonate (PC) and Acrylonitrile-Butadiene-Styrene (ABS) recovered from computer housings and other electronic applications. The rheological properties of both the recycled and virgin polymers are measured in simple shear using a Rheometrics RMS 800 Rheometer at a number of temperatures. Different compositions are also prepared using a twin screw extruder by blending recycled polymer with virgin pellets. Constitutive modelling of the rheological properties of these blends is carried out by using the Wagner integral constitutive equation. The differences in the rheological behavior of these polymers with changing composition and the applicability of the Wagner model will be reported. Their mechanical properties and processing behavior are also discussed.

- **Paper SL11** (Tuesday, 4:00, Hall of Ideas H) will be presented by Prashant G. Joshi.
- **Paper HT21** (Thursday, 11:25, Meeting Room L-M) is replaced with:

DO FATS ACT AS LUBRICANTS IN FOODS?

Suzanne Giasson¹, Imane Lahlou², Sumana Chakrabarti³, Tonya Kuhl⁴, and Jacob Israelachvili⁴

¹Department of Chemical Engineering, Laval University, Ste-Foy, Quebec G1K 7P4, Canada; ²Laval University, Ste-Foy, Quebec, Canada; ³Pillsbury, Minneapolis, MN; ⁴University of California - Santa Barbara, Santa Barbara, CA

Rheological behaviors of foods are important for developing food products, both for texture perceptions as well as for processing purposes. One of the major challenges in food development work has been in understanding the role of fats in the control of food properties such as texture, flavors, mouthfeel, etc. It has been conjectured that fats provide lubrication and thus alter the perception of texture. In general, food products containing fats are also easier to process, presumably for the same lubricating effects. However, this reasoning has been a hypothesis only, as bulk rheological testing has not been effective in differentiating between products with or without fat. Using the Surface Forces Apparatus (SFA) technique and FEKO optical interferometry, we have characterized the thin-film morphology and measured the tribological and other interfacial properties of different food systems. We plan to show that fats do, indeed, act as lubricants and that the SFA experiments capture those lubricating processes very well. Data for flour /water batter systems as well as for a series of different mayonnaises will be presented. The results reveal new tribological properties that help to uniquely differentiate between different food samples and provide a new mechanistic hypothesis for sensory perceptions which cannot be deduced from bulk properties.

Monday, October 18

Morning

8:30 **PL1.** Determining molecular weight distributions from the rheological properties of polymer melts. *W. H. Tuminello* Lecture Hall

9:20

COFFEE

Hall of Ideas G

Polymer Solutions and Gels

9:45 **SG1.** Viscoelastic properties of gelatins from alternative sources. *P. M. Gilsean and S. Ross-Murphy*

10:10 **SG2.** Rheological behavior of cross-linked elastomeric polypeptide gels. *F. Prochazka, J. Lee, C. W. Macosko and D. W. Urry*

10:35 **SG3.** Diffusing wave spectroscopy of cytoskeletal polymer gels. *D. Wirtz, A. F. Palmer and J. Xu*

11:00 **SG4.** Structure vs. rheological properties in thermoreversible gels from polymers and biopolymers. *J. M. Guenet*

11:25 **SG5.** Scaling behavior: Effect of precursor concentration and precursor molecular weight on the modulus and swelling of endlinked networks. *K. Sivasailam and C. Cohen*

11:50

Hall of Ideas H

Industrial Rheology

IR1. Modeling of flow-induced crystallization (FIC) in high-speed melt spinning. *A. K. Doufas and A. J. McHugh*

IR2. Analysis of nonisothermal melt spinning with ongoing crystallization. *J. Sun, S. Subbiah and J.-M. Marchal*

IR3. Edge effects in film casting of polymer melts. *K. Canning and A. Co*

IR4. Analysis of bowing phenomena at tenter process of biaxially oriented polypropylene film. *S. W. Kim, M. H. Kwon, B. K. Song, S. M. Yang and O. O. Park*

IR5. On slip effects in free coating of non-Newtonian fluids. *K. Sadeghy and M. Ghasemian-Amiri*

Hall of Ideas I

Non-Newtonian Fluid Mechanics

FM1. Rheological and structural studies of alkanes confined between metal and metal oxide surfaces. *R. Khare and D. Rigby*

FM2. Flow-induced orientation of a flexible-chain polymer monolayer. *D. J. Olson, G. G. Fuller, J. Hagting and A. J. Schouten*

FM3. An experimental and simulation study of the behavior of single polymer chains in exponential and linearly-ramped shear flows. *T. Kwan and E. Shaqfeh*

FM4. Modeling flows of dilute polymeric solutions in complex flows with dumbbell based molecular models. *M. Somasi and B. Khomami*

FM5. Lagrangian particle methods for computing transient viscoelastic flows. *P. Wapperom, X. Gallez, P. Halin, R. Keunings and V. Legat*

Hall of Ideas J

Liquid Crystals

LC1. In-situ x-ray scattering investigation of the evolution of molecular orientation during transient flows of model thermotropic liquid crystalline polymers. *V. M. Ugaz, W. R. Burghardt, J. A. Kornfield and W. Zhou*

LC2. Shear orientation and rheology of a main-chain thermotropic LCP: Flow-alignment and orientational flipping in steady and oscillatory shear. *W. Zhou, J. A. Kornfield, V. M. Ugaz, N. Vaish and W. R. Burghardt*

LC3. Dynamics of shear aligning of nematic liquid crystal monodomains. *B. L. Van Horn, D. Boudreau, and H. H. Winter*

LC4. Flow-induced isotropic-nematic transition in thermotropic polymers of varying spacer length. *P. T. Mather, H. G. Jeon, D.-O. Kim and C. D. Han*

LC5. Study of rheological transition by photo-induced isomerization on Langmuir monolayers of azobenzene derivatives. *K. S. Yim, G. G. Fuller and C. W. Frank*

BUSINESS LUNCHEON Grand Terrace (4th floor)

Afternoon

Hall of Ideas G

Polymer Solutions and Gels

Hall of Ideas H

Industrial Rheology

Hall of Ideas I

Non-Newtonian Fluid Mechanics

Hall of Ideas J

Liquid Crystals

1:30	SG6. Network structure dependence of free volume on chain ends. <u>J. J. Fedderly</u> , G. F. Lee, J. D. Lee, B. Hartmann, K. Dusek and M. Smrckova	IR6. Wire coating by drawdown of an extruded annular melt. <u>F. Ding</u> , A. J. Giacomini, J. C. Slattery and A. J. Hade	FM6. On the use of open boundary condition method in the numerical simulation of nonisothermal viscoelastic flow. S. J. Park and <u>S. J. Lee</u>	LC6. Brownian dynamics simulations of the Doi theory for liquid crystalline polymers. T. W. Bell, J. D. Schieber, J. J. de Pablo and M. D. Graham
1:55	SG7. Polymer solutions and gels in nematic solvents. J. A. Kornfield, M. D. Kempe, S.-T. Wu and C. K. Ober	IR7. Time dependent rheology of paper coatings. <u>R. R. Iyer</u>	FM7. Visco-elastic analysis of polymer melts in complex flows. <u>W. Verbeeten</u> , A. Bogaerds, G. Peters and F. Baaijens	LC7. A wavelet-Galerkin method for simulating the Doi model with orientational dependent diffusivity. <u>J. K. Suen</u> , R. A. Brown and R. C. Armstrong
2:20	SG8. Solvent and ion effects on the gelation of kappa-carrageenan. <u>S. Ramakrishnan</u> and R. K. Prud'homme	IR8. Rheological characterization and processing of recycled polymers. R. Liang and <u>R. K. Gupta</u>	FM8. The influence of the transient extensional viscosity on the Couette pressure correction and the vortex growth dynamics in an axisymmetric contraction-expansion. <u>J. P. Rothstein</u> and G. H. McKinley	LC8. Simulation of the flow of a nematic polymer in an eccentric cylinder geometry using the Doi theory. <u>M. Grosso</u> , P. Halin, R. Keunings, V. Legat, N. Grizzuti and P. L. Maffettone
2:45	SG9. Rheology of F-actin solutions determined from tracer motion. <u>T. G. Mason</u> , T. Gisler and D. A. Weitz	IR9. Multilayer coextrusion reveals interfacial slip. <u>R. Zhao</u> and C. W. Macosko	FM9. Effects of long chain branching on the flow stability of LLDPE's. P. J. Doeringhaus, S. E. Bin Wadud and <u>D. G. Baird</u>	LC9. Phase coexistence and phase separation of the Doi model in shear flow. <u>P. D. Olmsted</u> and C.-Y. D. Lu
3:10			COFFEE	
3:35	SG10. Dynamic light scattering and dynamic viscoelasticity of poly(vinyl alcohol) in aqueous solutions: Temperature effect. <u>N. Nemoto</u>	IR10. Cross-channel layer rearrangement in coextrusion. <u>D. A. Devens, Jr.</u>	FM10. Studying extrudate swell of polymer melts using flow birefringence and linear viscoelasticity. <u>J. R. Barone</u> and S.-Q. Wang	LC10. A theory for flowing nematic polymers with orientational distortion. <u>J. Feng</u> , G. Sgalari and G. Leal
4:00	SG11. Molecular weight exponents for diffusion and viscosity in entangled polymer solutions and melts. <u>T. P. Lodge</u>	IR11. Suspensions in elongational flows: Characterization of the flow behavior and its correlation to application properties. <u>N. Willenbacher</u>	FM11. Further studies on the deformation of a viscoelastic drop in a potential vortex. <u>K. Sarkar</u> and W. R. Schowalter	LC11. Exact and modulated LCP patterns. <u>G. Forest</u> , Q. Wang and H. Zhou
4:25	SG12. Role of the force balance on the nodes of an entangled network. <u>G. Marrucci</u> , F. Greco and G. Ianniruberto	IR12. In line study of droplet deformation during blends extrusion: Droplets, strings and vorticity alignment. <u>K. B. Migler</u> , E. K. Hobbie and F. Qiao	FM12. Shear-induced rupturing of a viscous drop. Y. Renardy, J. Li and <u>M. Renardy</u>	LC12. On patterns in flows of nonhomogeneous LCPs. <u>Q. Wang</u> , G. Forest and H. Zhou
4:50	SG13. The packing length influence in linear polymer melts on the entanglement, critical and reptation molecular weights. <u>L. J. Fetters</u>	IR13. Rheological characterization of one-component epoxy adhesives for automotive applications. <u>S. I. Dakin</u> , J. M. Smolinski and C. W. Manke	FM13. Modeling viscoelastic drop deformation via FEM. <u>R. W. Hooper</u> , C. W. Macosko and J. J. Derby	LC13. Linear viscoelasticity of nematic liquid crystalline polymer melts. <u>D. R. Long</u> and D. C. Morse
5:15			END	
7:00		SOCIETY RECEPTION	Community Terrace (2nd floor)	

Tuesday, October 19

Morning

8:30 **PL2.** Interpreting the rheology of dispersions in terms of time scales and forces. W. B. Russel Lecture Hall

9:20 COFFEE

Hall of Ideas G

Polymer Solutions and Gels

9:45 **SG14.** Brownian dynamics simulations of extensional flows of DNA and polystyrene solutions. L. Li and R. G. Larson

10:10 **SG15.** Low viscosity elastic liquids. D. V. Boger

10:35 **SG16.** Prediction of the nonlinear shear rheology of beta-glucan/amylopectin solution blends using a K-BKZ model. C. J. Carriere and G. E. Inglett

11:00 **SG17.** The damping function in polystyrene/ortho-terphenyl semidilute solutions. V. Soulivong and G. B. McKenna

11:25 **SG18.** Binary contacts in semi-dilute solution: Good and theta solvents. M. M. Adam, B. Farago, E. Raspaud and D. Lairez

11:50

Hall of Ideas H

Rheology of Solids

SL1. Isothermal, isochronal and isostructural responses of amorphous PEN in the glassy state. M. L. Cerrada and G. B. McKenna

SL2. Simultaneous measurement of torque, axial force and volume change in the torsional dilatometer: Experiments and analysis. C. R. Schultheisz and G. B. McKenna

SL3. Material damping via resonant ultrasound spectroscopy: A comparison with broadband viscoelastic spectroscopy. T. Lee, R. Lakes and A. Lal

SL4. Viscoelastic behavior of superplastic eutectic Pb-Sn over eleven decades of frequency and time. R. Lakes, P. Buechner and D. Stone

SL5. Viscoelastic behavior of polyhedral oligosilsesquioxane reinforced polymers. A. Lee, H.-P. Geng, S. Phillips and J. D. Lichtenhan

Hall of Ideas I

Non-Newtonian Fluid Mechanics

FM14. Stability of viscoelastic periodic channel flow. J. Liu and R. Sureshkumar

FM15. End effects and inertial-elastic interactions in unstable viscoelastic Taylor-Couette flow. J. M. White and S. J. Muller

FM16. Turbulent flow in an elastic polymer solution at low Reynolds numbers. A. Groisman and V. Steinberg

FM17. Turbulent pipe flow with polymer additives at maximum drag reduction. P. K. Ptasincki, B. H. van den Brule, M. A. Hulsen and F. T. Nieustadt

FM18. Nonlinear analysis of viscoelastic Dean vortex flow. K. A. Kumar and M. D. Graham

LUNCH

Hall of Ideas J

Polymer/Particle Mixtures

PM1. Effect of fillers on the crosslinking of a photocurable polymer: Gel point rheology and the Winter-Chambon criterion. B.-s. Chiou, S. R. Raghavan and S. A. Khan

PM2. Block copolymers for dispersing silica in polymer melts. D. Gurovich, C. W. Macosko and M. Tirrell

PM3. Yield stress and microstructure in ferrite filled polyvinyl chloride. S. K. Ahuja, H. Chang and T.-S. Chow

PM4. Mixing and rheological behavior of highly-filled polymer ceramic pastes. J. A. Walberer and A. J. McHugh

PM5. Rheology of polymer layered-silicate nanocomposites. R. Krishnamoorti, J. Ren and A. Silva

Afternoon

Hall of Ideas G

Polymer Solutions and Gels

1:30 **SG19.** On the use of molecular models to derive the molecular weight distribution of linear polymers from viscoelastic measurements. G. Marin and F. Léonardi

Hall of Ideas H

Rheology of Solids

SL6. Critical evaluation of a nonlinear viscoelastic constitutive model for glassy polymers. D. B. Adolf, R. S. Chambers, P. Shrikhande, G. Medvedev and J. M. Caruthers

Hall of Ideas I

Non-Newtonian Fluid Mechanics

FM19. Bifurcations and transition to chaos in cone-and-plate flow. D. O. Olagunju

Hall of Ideas J

Polymer Melts and Solutions

MS1. Brownian dynamics of single DNA chains in steady and transient shear flow. J. S. Hur, E. Shaqfeh and R. G. Larson

1:55	SG20. Theory of linear viscoelasticity of chiral liquid crystals. <u>A. D. Rey</u>	SL7. Meso-scale model including fluctuations to describe volume relaxation in polymeric glasses. <u>G. Medvedev and J. M. Caruthers</u>	FM20. Role of fluid elasticity and dynamic modulation on stability of unidirectional free surface flows. <u>C.-T. Huang and B. Khomami</u>	MS2. Rheology of a C100 polyethylene melt in planar Couette flow: A molecular dynamics study. <u>J. D. Moore, S. T. Cui, P. T. Cummings and H. D. Cochran</u>
2:20	SG21. Rheology and structure in mixed systems of worm-like micelles and nonionic polymer. <u>L. M. Walker and M. H. Truong</u>	SL8. Constitutive model for predicting the stress response of sulfur vulcanized rubbers during simultaneous deformation and chemical aging. <u>P. Ghosh, S. Katare, P. Patkar and J. M. Caruthers</u>	FM21. Stress/concentration/slip instabilities in Couette flow of polymer solutions. <u>W. B. Black and M. D. Graham</u>	MS3. Stochastic simulation of a full-chain reptation model with constraint release, chain-length fluctuations, and chain stretching. <u>J. Neergaard, J. D. Schieber and C.-C. Hua</u>
2:45	SG22. Surface rheology of a dendritic monolayer. <u>J. P. Kampf, C. F. Brooks, C. W. Frank, G. G. Fuller, C. Hawker and E. E. Malmström</u>	SL9. The relationship between the energy landscape and viscoelastic relaxation for glassy materials. <u>R. Bhatia, G. Medvedev, D. S. Corti and J. M. Caruthers</u>	FM22. Shear banding in the Johnson-Segalman model with a diffusion term. <u>Q. Radulescu, P. D. Olmsted and C.-Y. D. Lu</u>	MS4. Rheological and optical properties of entangled polymer under shear and elongational flows. <u>C.-C. Hua and H.-H. Chen</u>
3:10			COFFEE	
3:35	SG23. Rheological properties of associative model polymers and polyoxyethylene. <u>D. J. Plazek and Z. N. Frund, Jr.</u>	SL10. A multi-mechanism constitutive model for cerebral arterial tissue. <u>R. Wulandana and A. M. Robertson</u>	FM23. Asymptotic structure of the stress field in high Weissenberg number flow past a cylinder. <u>M. Renardy</u>	MS5. Quantitative predictions of LVE rheological properties of monodisperse, bidisperse and polydisperse entangled polymers. <u>C. Pattamaprom and R. G. Larson</u>
4:00	SG24. Significance of Rouse segment in viscoelasticity of bulk polymers. <u>K. Osaki and T. Inoue</u>	SL11. Modeling of steady and time dependent behavior of crosslinked, filled polymers. <u>A. Leonov and P. G. Joshi</u>	FM24. On flows of polymers in long channels and dies. <u>M. Siline and A. Leonov</u>	MS6. Application of the simplified CCR model to polydisperse linear polymers: Transient extensional viscosity. <u>S. D. Mishler, M. K. Lyon, D. Mead, R. G. Larson and M. Doi</u>
4:25	SG25. Do dilute solution polymer dynamics studies probe dynamic spatial heterogeneities in glass-forming solvents?. <u>J. L. Schrag</u>	SL12. Surface deformation of crosslinked polyesters. <u>S. K. Ahuja, H. Chang and A. Strojny</u>	FM25. Non-Newtonian effects on rigid and deformable reverse roll coating. <u>C. Tiu, L. Wang and T.-J. Liu</u>	MS7. 2D Maxwell model. <u>V. B. Birman and W. K. Binienda</u>
4:50	SG26. The dynamic scaling approach to glass formation. <u>R. H. Colby</u>	SL13. A model for stress evolution during thermoset cure. <u>Y. Mei, A. S. Wineman and A. F. Yee</u>	FM26. A numerical study of simple shearing flow of foams. <u>G. J. González-Santos and D. A. Reinelt</u>	MS8. Exponential shear flow of polymer melts. <u>D. Venerus</u>
5:15			END	
5:30			BUSINESS MEETING	Hall of Ideas
7:00			AWARDS RECEPTION	Grand Terrace (4th floor)
8:00			AWARDS BANQUET	Ballroom A-B

Wednesday, October 20

Morning

8:30 **PL3.** Effect of polymer coats on the rheology of stable and flocculated colloidal suspensions. *J. Mewis* Lecture Hall

9:20 COFFEE

Hall of Ideas G

Blends and Block Copolymers

9:45 **BC1.** Morphology predictions from normal stress measurements for dilute immiscible polymer blends. *M. Minale and P. L. Maffettone*

10:10 **BC2.** Droplet vorticity alignment in model polymer blends under shear. *K. B. Migler*

10:35 **BC3.** Rheology of a viscoelastic emulsion with a liquid crystalline polymer dispersed phase. *H. S. Lee and M. M. Denn*

11:00 **BC4.** An adaptation of the Doi-Ohta theory to the predictions of droplet shape changes and stresses in the flow of immiscible blends. *A. S. Almusallam, R. G. Larson and M. J. Solomon*

11:25 **BC5.** Morphological development of immiscible polymer blends in complex flows. *B. E. Priore and L. M. Walker*

11:50

Hall of Ideas H

Heterogeneous Systems

HT1. Effects of ordering in the near-wall region on the apparent viscosity of suspensions. *J. G. Kralj, A. E. Kaiser, J. R. Abbott, A. L. Graham and J. W. Leggoe*

HT2. Concentrated suspension flow into a contraction. *J. F. Morris and R. M. Miller*

HT3. Shear-induced normal stresses and diffusivities in a dilute suspension of non-brownian hard spheres. *I. E. Zarraga and D. T. Leighton*

HT4. Frame-invariant models for suspension flows. *Z. Fang, A. A. Mammoli, J. F. Brady, M. S. Ingber and L. A. Mondy*

HT5. Rheological properties of concentrated suspensions of non-colloidal particles. *F. Cotton, P. J. Carreau and M. Perrier*

Hall of Ideas I

Shear-free Flows

SF1. An interlaboratory comparison of measurements from filament-stretching rheometers using common test fluids. *S. L. Anna, G. H. McKinley, D. A. Nguyen, T. Sridhar, S. J. Muller, J. Huang and D. F. James*

SF2. Birefringence and stress in uniaxial extension of polymer solutions. *T. Sridhar, D. A. Nguyen and G. G. Fuller*

SF3. The effect of a known preshear history on the transient stress growth in uniaxial elongational flows of dilute polystyrene solutions. *S. L. Anna, M. Yao and G. H. McKinley*

SF4. A new model suitable for flows with strong extensional components. *I. Ghosh, G. H. McKinley, R. A. Brown and R. C. Armstrong*

SF5. Kinematic dependent anisotropy in strong flows of dilute polymer solutions. *J. M. Wiest*

LUNCH

Afternoon

Hall of Ideas G

Blends and Block Copolymers

1:30 **BC6.** Monitoring blend coalescence via particle size distribution and rheology. *S. Lyu, F. S. Bates and C. W. Macosko*

Hall of Ideas H

Heterogeneous Systems

HT6. Simulation of monodisperse suspension flow. *A. Sun and R. Rao*

Hall of Ideas I

Shear-free Flows

SF6. Stress and birefringence measurements during the uniaxial elongation of polymer melts. *D. Venerus, S.-H. Zhu and H. C. Oettinger*

Hall of Ideas J

Polymer Melts and Solutions

MS9. On the constitutive modeling of LDPE Melt I. *A. Leonov and M. V. Simhambhatla*

MS10. Diagnosing long-chain branching in polyethylenes. *J. Janzen and R. H. Colby*

MS11. The effect of pressure on the viscosity of long chain branched metallocene polyethylenes. *S. A. Mcglashan, P. M. Wood-Adams and J. M. Dealy*

MS12. The rheology of polymeric fluids at elevated pressures. *D. M. Binding, M. A. Couch and K. Walters*

MS13. Dynamics of sulfonated styrene-ethylene-butene random ionomer melts. *N. K. Tierney and R. A. Register*

Hall of Ideas J

Polymer Melts and Solutions

MS14. Rheology of shear thickening water-soluble associating polymer solutions. *S. X. Ma and S. L. Cooper*

- 1:55 **BC7.** The influence of block copolymer on the phenomena of collision and film drainage governing droplet coalescence in immiscible blends. S. D. Hudson, A. M. Jamieson, I. Manas-Zloczower, A. R. Ramic, J. C. Stehlin, B. E. Burkhart and W. Sphanowong
- 2:20 **BC8.** A new stress-optical relation in two-phase liquid/liquid mixtures. P. Van Puyvelde, P. Moldenaers and J. Mewis
- 2:45 **BC9.** Examining the dynamic rheological behavior of an LCST polymer blend in the two-phase region. D. B. Hess and S. J. Muller
- 3:10
- 3:35 **BC10.** Stress-induced morphological transition in the body-centered cubic phase of block copolymer melts. J. M. Sebastian, C. Lai, R. A. Register and W. W. Graessley
- 4:00 **BC11.** Structure and dynamics of giant block copolymer micelles. D. Vlassopoulos, R. Sigel, G. Fytas, S. Pispas and N. Hadjichristidis
- 4:25 **BC12.** Orientation of polymeric hierarchical nanostructures by oscillatory shear flow. K. de Moel, R. Makinen, J. Ruokolainen, O. Ikkala and G. ten Brinke
- 4:50 **BC13.** Rheology of layered silicate based block copolymer nanocomposite. Y. T. Lim and O. O. Park
- 5:15
- 5:30
- HT7.** High frequency rheology of concentrated charge-stabilized polymer dispersions. J. Bergenholtz, F. M. Horn, W. Richtering, N. J. Wagner and N. Willenbacher
- HT8.** The rheology and microstructure at the shear thickening transition for near hard sphere colloidal dispersions. B. Maranzano and N. J. Wagner
- HT9.** Structural evolution during colloidal gel formation: Power law relaxation and superposition of viscoelastic spectra. R. J. Butera
- HT10.** A small-angle light scattering study of the gelation of thermoreversible colloidal suspensions. P. Varadan and M. J. Solomon
- HT11.** Stokesian dynamics simulations of the rheological behavior of rigid spheres suspended in a viscoelastic medium. H. M. Schaink, J. J. Slot, R. J. Jongschaap and J. Mellema
- HT12.** A study of flow induced structures within an electrorheologically active suspension under steady shear flow. S. W. Henley and F. E. Filisko
- HT13.** A model system for the study of electrorheological behavior in gels. B. Liu and M. T. Shaw
- SF7.** Results of a round-robin experiment testing LLDPE extensional viscosity on commercial RME rheometers. J. S. Schulze, T. P. Lodge and C. W. Macosko
- SF8.** Inflation and instability of a polymeric membrane. J. Neergaard and O. Hassager
- SF9.** Atomization: Control of drop size distribution by rheology. V. Romagnoli, P. Felton and R. K. Prud'homme
- MS15.** A phenomenological model for shear-thickening. J. L. Goveas
- MS16.** Dynamic response of functionalized star polymer melts. D. Vlassopoulos, T. Pakula, G. Fytas, M. Pitsikalis and N. Hadjichristidis
- MS17.** The effects of molecular variables and architecture on the rheological behavior of dendritic polymers. I. Sendjarevic and A. J. McHugh
- MS18.** Melt rheology of polylactide blends. J. R. Dorgan, H. J. Lehermeier, D. Knauss and M. Mang
- MS19.** Effect of starch packing on viscosity of highly starch-filled poly(hydroxy ester ether) composites. G. Zhou, J. L. Willett and C. J. Carriere
- MS20.** Prediction of rheological properties of hard wheat flour using nonlinear differential viscoelastic models. M. Dhanasekharan and J. L. Kokini
- MS21.** Nonlinear rheology of entangled polymers. L. A. Archer
- COFFEE
- General Session**
- GN1.** Dynamics of individual flexible polymers in a shear flow. D. Wirtz, P. Leduc, C. Haber and G. Bao
- GN2.** Evidence for a stress-thermal rule in deforming polymers. D. Venerus, J. D. Schieber, J. D. Guzman and H. Iddir
- GN3.** The Jaumann derivative: An interpretation from within the body manifold of Lodge. A. D. Freed
- GN4.** Structural rheological model: Applications to biofluids. N. Sun and D. De Kee
- END
- POSTER SESSION & REFRESHMENTS Grand Terrace (4th floor)

Thursday, October 21

Morning

Hall of Ideas G

Blends and Block Copolymers

- 8:05 **BC14.** Linear rheology of lamellar diblocks compared to their hetero-four-arm star block copolymer analogs. *D. M. A. Buzza, A. F. Fzea, J. B. Allgaier, R. N. Young, D. J. Groves and T. C. Mcleish*
- 8:30 **BC15.** Simulation of diblock copolymer melts by dissipative particle dynamics. *K. Zhang, G. Pan and C. W. Manke*
- 8:55 **BC16.** Phase transition in a triblock-diblock copolymer blend. *A. Silva and R. Krishnamoorti*
- 9:20 **BC17.** Dynamics of model miscible polyolefin blends. *J. A. Pathak, R. H. Colby, G. Floudas, R. Krishnamoorti, L. J. Fetters and R. Faust*
- 9:45
- 10:10 **BC18.** Scaling of the relaxation times for different relaxation mechanisms in immiscible polymer blends. *P. Moldenaers, P. Van Puyvelde and J. Mewis*
- 10:35 **BC19.** Monomeric friction factors in polymer mixtures. *T. P. Lodge and J. M. Milhaupt*
- 11:00 **BC20.** On the blends of hyperbranched polymers with linear polymers. *M. E. Mackay, Y. Hong, J. J. Cooper-White, C. Hawker and E. Malmstrom*
- 11:25 **BC21.** Rheological study of the effect of molecular parameters and temperature on the miscibility of polyethylene blends. *I. A. Hussein and M. C. Williams*

Meeting Room L-M

Heterogeneous Systems

- HT14.** The effect of surface chemistry on nonlinear conduction in electrorheological suspensions. *P. J. Rankin, J. L. Shohet and D. J. Klingenberg*
- HT15.** Electrorheological fluids containing particulate and liquid droplet bi-dispersed phase. *B. D. Chin and O. O. Park*
- HT16.** A continuum approach to electro- and magnetorheology. *Y. M. Shkel and D. J. Klingenberg*
- HT17.** Elastic-plastic deformation of a soft solid by an expanding bubble. *P. A. Gauglitz, T. Terrones, D. P. Mendoza and C. A. Aardahl*
- HT18.** Simple shearing flow of a dry soap froth with random structure. *A. M. Kraynik and D. A. Reinelt*
- HT19.** Rheology of polyampholyte (gelatin) stabilized latex. *K. A. Vaynberg, B. Maranzano and N. J. Wagner*
- HT20.** Long-time non-preaveraged diffusivity and sedimentation velocity of clusters: Applications to micellar solutions. *V. Ganesan and H. Brenner*
- HT21.** Do fats act as lubricants in foods?. *S. Giasson, I. Lahlou, S. Chakrabarti, T. Kuhl and J. Israelachvili*

Meeting Room P-Q

General Session

- GN5.** Morphology variations and flow anomalies in extrusion of polypropylene-EP rubber blends. *K. Jayaraman, J. Lopez, S.-Y. Kang and C.-C. Shu*
- GN6.** Microrheometry for polymer melts and concentrated solutions. *G. J. Braithwaite and G. H. McKinley*
- GN7.** Simulation of flow of dilute polymeric solutions through a 4:1:4 axisymmetric contraction/expansion geometry using constitutive equations based on the elastic dumbbell model. *B. Yang and B. Khomami*
- GN8.** Post-die extrusion of plastic pipe. *A. J. Hade, A. J. Giacomini, J. C. Slattery and D. N. Githuku*

COFFEE

- GN9.** On loss of existence and uniqueness of perturbation solutions for steady, fully developed flows of viscoelastic fluids in curved pipes. *A. M. Robertson*
- GN10.** Elongational rheology of polymer melts and solutions using hyperbolic dies. *J. Collier, S. Petrovan and B. Seyfzadeh*
- GN11.** Determination of the memory function of a constant viscosity viscoelastic fluid (Boger fluid) in extensional flow by Tikhonov Regularisation. *L. Y. Yeow*
- GN12.** The effect of rheology in film casting. *E. Mitsoulis and M. Beaulne*

Hall of Ideas J

Polymer Melts and Solutions

- MS22.** A nonlinear fluid standard reference material - SRM 2490: Progress report. *C. R. Schultheisz and G. B. McKenna*
- MS23.** Rheology of polymeric solutions: Zero-shear conditions. *V. Yasnovsky*
- MS24.** Shear enhanced concentration fluctuations in a polymer solution. *G. T. Templin and D. J. Pine*
- MS25.** Stretching and breakup of entangled polymeric liquids. *A. Tripathi, S. H. Spiegelberg and G. H. McKinley*
- MS26.** Effect of die geometry on the onset of gross melt fracture. *S. Kim and J. M. Dealy*
- MS27.** Excess edge effect in rotational parallel plate rheometry. *D. W. Giles and R. W. Hooper*
- MS28.** Flow enhancement during the extrusion of LLDPE melts. *J. Pérez-González and M. M. Denn*
- MS29.** Influence of the residence time in the unstable flow of cetyltrimethylammonium tosylate (CTAT) aqueous solutions. *L. De Vargas, J. Pérez-González, A. F. Méndez-Sánchez, S. Hernández-Acosta, A. González-Alvarez and O. Manero*

11:50 **BC22.** Elastic behavior of thermoplastic polyurethanes probed by rheo-optical FTIR spectroscopy. R. Kannan and G. Hofmann

HT22. Colour rheology of liquid paint during and after shear. Y.-k. Chen and M. R. Mackley

GN13. Novel application of synergistic guar/non-acetylated xanthan gum blends in hydraulic fracturing. R. C. Navarrete, C. C. Fischer, M. D. Coffey and V. G. Constien

MS30. Polyethylene melt adsorption and desorption in flow: Fluorescence characterization of post-extrusion die walls. J. R. Barone and S.-Q. Wang

12:15

END

Poster Session

Wednesday 5:30 PM Grand Terrace (4th floor)

- PO1.** Rheology of suspensions of non-Brownian fibers with adhesive contacts. *M. Chaouche and D. L. Koch*
- PO2.** Rheology and microstructure of solidifying suspensions. *C. Journeau, M. Ramacciotti and G. Cognet*
- PO3.** Rheology of highly concentrated, bimodal dispersions with colloidal interactions. *B. Dames, B. Morrison and N. Willenbacher*
- PO4.** Rheological signatures of solid-liquid transitions in particulate suspensions. *S. Pyett and R. A. Lionberger*
- PO5.** Flocculation in flowing fiber suspensions. *C. F. Schmid, L. H. Switzer and D. J. Klingenberg*
- PO6.** Influence of surfactant-induced elasticity on fluid motion and mixing in a continuously stirred tank. *R. Sureshkumar, J. Piper and A. Rammohan*
- PO7.** Flow visualization of drag-reducing surfactant solutions in pipes. *K. Gasljevic and E. Matthys*
- PO8.** Rheology of cellulose acetate in methylene chloride/methanol solutions. *C. P. Lusignan, C. M. Jarman and R. W. Connelly*
- PO9.** The solution properties of polyelectrolytes: A classical treatment. *L. C. Cerny and E. R. Cerny*
- PO10.** Rheology of polymeric solutions: Shear thinning. *V. Yasnovsky*
- PO11.** Stability of non-isothermal viscoelastic Taylor-Couette flow using time-dependent simulations. *U. A. Al-Mubaiyedh, R. Sureshkumar and B. Khomami*
- PO12.** A stochastic simulation approach to study the stability and dynamics of complex viscoelastic flows. *M. Somasi and B. Khomami*
- PO13.** This paper has been withdrawn.
- PO14.** Lubricated squeezing flow of Herschel-Bulkley fluids at constant force. *M. M. Ak and S. Gunasekaran*
- PO15.** Periodic motion of particles settling in an axisymmetric geometry. *Z. Quinsheng and P. E. Clark*
- PO16.** This paper has been withdrawn.
- PO17.** Buckling instabilities in models of viscoelastic free surface flows. *K. A. Kumar and M. D. Graham*
- PO18.** Simulation of the viscoelastic flow of molten plastics. *M.-C. D. Heuzey, A. Fortin and J. M. Dealy*
- PO19.** Elasticity of polymer networks. *M. Rubinstein and S. Panyukov*
- PO20.** This paper has been withdrawn.
- PO21.** Interrelation of ligament creep and relaxation. *R. Vanderby and R. Lakes*
- PO22.** Rheological properties of peanut butter. *G. Citerne and P. J. Carreau*
- PO23.** Viscoelasticity of gelatin blends from alternative sources. *P. M. Gilsenan and S. Ross-Murphy*
- PO24.** Rheology of paraffinic oils. *M. Kané, M. Djabourov and J.-L. Volle*
- PO25.** Shear-induced oscillations of dynamic modulus in polymer gels. *E. E. Pashkovski and L. Miller*
- PO26.** Viscoelasticity and shear thinning in xenon. *R. F. Berg and M. R. Moldover*
- PO27.** Determination of nonlinear viscoelastic properties of wheat dough by large amplitude oscillatory shear (LAOS) test. *C. H. Hwang, S. Gunasekaran and A. J. Giacomin*
- PO28.** Evaluation of structure development during gelation of xanthan and carob mixtures. *W. B. Yoon and S. Gunasekaran*
- PO29.** Rheological characterization of milk gelation using vegetable coagulants and chymosin. *C. Esteves, S. Gunasekaran, N. Olson and E. Pires*
- PO30.** Thermoreversible gelation of methyl cellulose A4M solutions. *R. W. Connelly, C. P. Lusignan, T. Duong and S. Sadasivan*
- PO31.** Salt effect on DNA oligomer binding in selfassembled nanostructures. *I. A. Shkel, H. Ni and T. Record*

- PO32.** Evidence of chaotic regimes in numerical simulations of the Doi theory for liquid crystalline polymers. M. Grosso, P. L. Maffettone, S. Crescitelli and R. Keunings
- PO33.** Modeling evolution of microstructure in discotic mesophase pitches under shear. A. P. Singh and A. D. Rey
- PO34.** A constitutive model for the behavior of semi-flexible rods in shear flow. L. E. Becker and M. J. Shelley
- PO35.** First observation of the isotropic-nematic phase transition temperature of liquid crystalline polymers on two-dimensional Langmuir monolayers. K. S. Yim, G. G. Fuller and C. D. Eisenbach
- PO36.** This paper has been withdrawn.
- PO37.** This paper has been withdrawn.
- PO38.** Measuring the zero-shear-rate viscosity using squeeze flow and interference fringes. E. C. Cua and M. T. Shaw
- PO39.** Structural and viscoelastic properties of lamellar systems formed from concentrated nonionic surfactant solutions. L. Halász, Z. Németh, J. Pálinkás and A. Bóta
- PO40.** Time-resolved transient viscous flows of a Newtonian drop in a Newtonian liquid. S. Guido, M. Minale and P. L. Maffettone
- PO41.** A pressure profile system for measuring the first and second normal stress coefficient of non-Newtonian fluids. O. F. Brauner, A. Tripathi and G. H. McKinley
- PO42.** Measurement of normal forces at the interface of two immiscible liquids using digital image analysis. W. Hoepfl and B. J. Lowry
- PO43.** Instability of the Doi-Edwards model in simple flows. Y. Kwon
- PO44.** Shear induced polymerization: A direct demonstration. D. Wirtz and C. Haber
- PO45.** Thermo-mechanical degradation in the preparation of polyethylene blends. I. A. Hussein and M. C. Williams
- PO46.** Using filament stretching rheometry to predict strand formation and processability of adhesives and other non-Newtonian fluids. A. Tripathi, P. Whittingstall and G. H. McKinley
- PO47.** A preliminary investigation of an electrorheological lubricant. B. M. Roberts and F. E. Filisko
- PO48.** The effect of small amounts of added secondary particles to an electrorheologically active suspension. S. W. Henley and F. E. Filisko
- PO49.** Characterization of commercial polyethylene melts using transient extensional viscosity and steady shear flow curves. A. Somwangthanaoj, W. T. Rogers, H. Dreze, S. D. Mishler, M. K. Lyon, D. Mead and F. E. Filisko
- PO50.** Small-angle X-ray scattering of shear flow oriented self-organized hierarchical polymeric nanostructures. R. Mäkinen, K. de Moel, J. Ruokolainen, W. De Odorico, M. Stamm, G. ten Brinke and O. Ikkala
- PO51.** Development and use of a novel cone and plate flow cell for x-ray scattering studies of materials from the vorticity plane: Preliminary results from a 13.5wt% pbg/m-cresol solution. F. E. Caputo and W. R. Burghardt
- PO52.** Morphological transition in sheared polymer blends: the interplay of coalescence, breakup and finite size. K. B. Migler