WHO SHOULD ATTEND

Engineers, chemists, physicists, and managerial personnel involved with plastics extrusion, applied rheology, blow molding, mixing and compounding, reactive processing, production of synthetic polymers, recycling and process equipment design and manufacturing will find this course beneficial. Engineers will gain an increased understanding of rheological behaviour including the role of molecular structure and will learn some of the unique engineering problems associated with polymer extrusion. Chemists will learn about fluid flow and heat transfer involving polymers and troubleshooting of extrusion equipment. Managers will obtain an overview of the technical problems associated with plastics extrusion.

Everyone will benefit from learning problem solving techniques based on rheological characterization and polymer flow considerations.
REGISTRATION FORM
RHEOLOGY AND EXTRUSION
FEBRUARY 22-23, 2007
(Please photocopy for additional registrations)

Name ____________________________________________

Company Name & Mailing Address:

_________________________________ _________________________

_________________________________ _________________________

_________________________________ _________________________

Telephone ____________________________

Fax ________________________________

Email ______________________________

Highest Degree Earned ____________________________
(B.Sc., M.Sc., Ph.D. and year earned)

Number of years experience in polymer processing ____________________________

Fees per person: 965 EURO

SPE Members: enter your membership number here and reduce fees by 100 EURO, to 965 EURO.

Payment by bank transfer □ VISA □
Cheque enclosed □
Send me an invoice □

VISA # ____________________________

EXPIRATION DATE ____________________________

CARDHOLDER NAME ____________________________

SIGNATURE ____________________________

Mail cheque and registration form to:

POLYDYNAMICS INC,
102 Plaza Drive, P.O. Box 83067
Dundas, Ontario, Canada L9H 4H0
Phone (905) 522-8816
Fax (905) 522-5004
Email pdsupport@polydynamics.com

Payment may also be made by bank transfer to: The
Bank of Nova Scotia, University Plaza, 24 Plaza Drive,
Dundas, ON, Canada L9H 4H4
Transit No. 90332 - Bank 002 - Account 00397-13
PROGRAM OUTLINE
THURSDAY, FEBRUARY 22, 2007
9:00 - 9:30  Welcome & Registration
9:30 - 12:30  Introduction to Rheology
Unusual rheological phenomena exhibited by polymer solutions and melts. The importance of rheology in polymer processing. Viscosity, melt flow index and melt strength, and their relation to molecular structure. The role of temperature, pressure, additives and fillers. The Dow Rheology Index for in situ technology polyolefins. Rheology of metallocene polymers.
12:30 - 14:00  Lunch
14:00 - 17:30  Rheology for Process Optimization
Shear and normal stresses. Viscoelasticity. Stress relaxation. Extensional viscosity. \( G' \) and \( G'' \) measurement and significance in polymer characterization. The role of rheology in mixing and blending. Rheological modifications by blending certain polymers, such as LLDPE and LDPE. Determination of VMD from rheological measurements. Predicting processability from rheology. Viscosity of suspensions. Rheology of wood plastic composites (WPC). Rheology of some nanocomposites. Problem solving using rheology.

FRIDAY, FEBRUARY 23, 2007
9:00 - 12:30  Melt Flow Through Dies, Extrudate Swell, Die Lip Build-up, Sharkskin and Melt Fracture
Unidirectional and multidimensional flows. Pressure drop and frictional heating (viscous dissipation). The mechanisms responsible for extrudate swell. Die lip build-up (drool) causes and remedies. Relation to molecular structure. Causes for the onset of sharkskin and gross melt fracture. The effects of adhesion and slip. The role of additives and processing aids. Recent theories and their application to process improvement.
12:30 - 14:00  Lunch
14:00 - 17:30  Extrusion and Troubleshooting
LECTURE NOTES

Each participant will receive a copy of the annually updated book of lecture notes on POLYMER RHEOLOGY AND EXTRUSION. This fact-filled book includes copies of the presentation slides, theory, detailed derivations of several important equations and numerous worked out problems. It is highly recommended for follow-up reading either as a quick information sourcebook or for in-depth study. It is easy to follow with the mathematical level kept to a minimum. Several key references are also given for persons wishing to continue upgrading their knowledge and understanding. It shows how to do simple calculations of shear rate, shear stress, pressure drop, temperature rise due to viscous dissipation, Rabinowitsch and Bagley corrections in capillary viscometry, wall slip velocity, flow throughput in extruders and much more. Whether you want practical problem solving information and troubleshooting tips or you want to understand the importance of recent developments, you will find this book indispensable.

Note: ENGLISH WILL BE USED IN ALL LECTURES AND COURSE NOTES

Questions, however, may be asked in German, French, Spanish or Greek. Dr. Vlachopoulos will translate the questions and will give the answers in English for the benefit of everyone.

For further information contact:
Dr. John Vlachopoulos,
POLYDYNAMICS, INC.
102 Plaza Drive, P.O. Box 63067
Dundas, ON, Canada L9H 4H0
Phone: +1 (905) 521-8815  FAX: +1 (905) 522-5004
Email: pdisupport@polydynamics.com

FOR INFORMATION ABOUT POLYDYNAMICS, INC.
VISIT OUR SITE ON THE INTERNET
www.polydynamics.com
GENERAL INFORMATION

REGISTRATION

- Tuition fee: 965 EURO includes registration, lecture notes, coffee and refreshments and two lunches.
- The number of participants is limited and it is therefore recommended that you register as early as possible.
- Companies may substitute a registered participant without notification, however, an advance notice would be greatly appreciated.
- For SPE members the tuition fee is 865 EURO.
- Non-members will receive one year SPE membership.

CANCELLATION

An administration fee of 100 EURO will be charged for cancellations received one week before the course starts. After this date there will be no refunding of registration fees but full credit can be given for another person from the same company or full credit for the next international course. SUBSTITUTIONS MAY BE MADE AT ANY TIME.

ACCOMMODATION

The lectures will be held at HOLIDAY INN BRUSSELS CITY CENTRE, Chaussée de Charleroi 38, 1060 Brussels, Belgium. Phone (+32) 2.533.66.66, (reservations phone (+32) 2.533.67.36, Fax (+32) 2.538.90.14). A block of rooms has been booked at 135 EURO per room per night, including breakfast. Occasionally, better rates might be obtained by Internet booking through www.ichotelsgroup.com. There are a lot of other hotels in Brussels city centre and Polydynamics can make alternate suggestions. All participants requiring accommodation must do their own reservations with Holiday Inn directly and quote "Polydynamics booking" to receive the above mentioned reduced rate.
HISTORY OF THE INTENSIVE SHORT COURSE

Versions of the intensive short course on Polymer Rheology and Processing have been presented by Dr. J. Vlachopoulos and his co-workers in Canada, Greece, Sweden, Venezuela, Mexico, USA, Finland, Czechoslovakia, Belgium, Brazil, Australia, Japan, Germany, Italy, Luxembourg and Netherlands. Over 1,000 polymer professionals have attended the lectures and provided their suggestions for improvement of the course content and the presentation style. The present international intensive short course will cover fundamentals, recent developments and will show how to use rheology to solve practical problems in the polymer industry.

LECTURER

Dr. JOHN VLACHOPOULOS started teaching at McMaster University after receiving his doctorate from Washington University, St. Louis, Mo., USA. He served as department Chairman (1985-88) and is currently Professor of Chemical Engineering and Director of the Centre for Advanced Polymer Processing And Design (CAPPA-D). He was on sabbatical research leave at I.K. T. Stuttgart, Germany (1975) and CEMEF, Ecole des Mines de Paris, Sophia Antipolis, France (1981-82, 1988-89). He is the author of more than 200 publications on polymer processing, rheology and computer aided methods. Over the years he has served as consultant to several hundred corporations. With his co-workers, he has developed the commercially available POLYCAD®, SPIRALCAD, CALENDERCAD, FLATCAD, PROFILECAD, EXTRUCAD (renamed NEXTRUCAD), LAYERCAD, T-FORMCAD, B-FILMCAD, RHEO-MWD and XTRU-XPERT software packages and founded POLYDYNAMICS, INC. He has lectured in USA, Canada, South America, throughout Europe, Japan and Australia. He received the 2001 Education Award of the Soc. Plast. Eng. (SPE) during the ANTEC in Dallas, Texas and the 2004 Distinguished Achievement Award of the Extrusion Division of SPE in Chicago. He is the President of the Polymer Processing Society (PPS) 2005-2007, and member of several professional associations. John Vlachopoulos is also coeditor of the “SPE Guide on Extrusion Technology and Troubleshooting” (2001). This book is available from SPE (www.4SPE.org).

The software packages have been licensed to several Fortune 500 corporations in the USA and many other large, medium and small companies in 27 countries around the world.

www.polydynamics.com
**PREVIOUS COMPANY REGISTRATIONS FROM EUROPE AND MIDDLE EAST (Partial Listing):**

<table>
<thead>
<tr>
<th>Country</th>
<th>Company Name</th>
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<tr>
<td><strong>AUSTRIA</strong></td>
<td>EREMA</td>
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<td><strong>BELGIUM</strong></td>
<td>EXXON CHEMICAL, FINA RESEARCH, TESSENDERLO CHEMIE, ACE, HYPLAST, SOLVAY, VERBURGGEN BOREALIS, SHELL RESEARCH, DSM, DPI, DECEUNINCK, N.V. ETERNIT, MOBIT PLASTICS, LUMINOXO VINYL, DEVRO TEEKPAK, GUNZEPLASTICS, MONTELL, BASEL, BAXTER, EVAL-KHUM, ATOFINA, DUPONT TELIN, CERTECH, BP SOLVAY, A. SCHULMAN PLASTICS, DUPONT DE NEMOURS, EXXONMOBIL, ATOFINA ELASTOMERS, SOLVAY ADVANCED POLYMERS, TOTAL, CERTECH, MILLIKIN, CRITL, NITTO, ALKOR DRAKA, PLASTIFLEX, BP HOPE, ETERNIT, LEUVEN HGSR, NITTO EUROPE, CABOT, COMMSCOPE, KABEL WEZEK URBEN, INBEV, COVEBE, CLARIANT</td>
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<td><strong>FINLAND</strong></td>
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<td><strong>FRANCE</strong></td>
<td>S.E. EXXON CHEMICAL, S.N. POURDES ET EXPLOPSIFS, MICHELIN, UNIV. ST. ETIENNE, PECHENY, ELOKEM, GOODWATER CHEMICALS, LINPAC, ARCELOR, CLARIANT, TORAY PLASTICS</td>
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<td><strong>GERMANY</strong></td>
<td>BASF, HOECHST, HENKEL, COROVAN, H. REINKE GMBH, DOW, OHM GMBH, KRUSENBURG TPE, FELIX SCHELLER, CLARIANT, BORSK, DBA, FIBERWEB, RED, BASEL, POLYPLAST MÜLLER</td>
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<td><strong>SWEDEN</strong></td>
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<td>EIMS-CHEMIE AG, BP, NICKIA MAILLEFER, BUEHLER AG, DOW EUROPE, CIBA, CB ENTERPRISE</td>
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<td><strong>U.K.</strong></td>
<td>BATTENFORD GLOENCE, GOUH ASSOC., SYMBOLIC SYSTEMS, ICI, STEWARTS &amp; LLOYDS, RAYCHEM, BP SOLVAY PE, DUPONT TELIN FILMS, IFABYR MINERALS, LONDON METRO U., MICROPOL LTD., TOTAL PETROCHEMICALS</td>
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