

**INSTITUTE FOR POLYMER RESEARCH  
UNIVERSITY OF WATERLOO  
WATERLOO, ONTARIO N2L 3G1**

**NEWSLETTER 2007**

**1. IPR SENATE RENEWAL**

We will start this year's newsletter by repeating the first item of last year's newsletter, given that it might be of interest to new readers and a "refresher" to others. The Senate Research Council (of the Senate) of the University of Waterloo (UW) reviews all UW senate-approved institutes every five years. IPR was reviewed in October, 2005 and received approval with accolades. The next review will take place in the fall of 2010.

A brief excerpt from the 2005 five-year review report is cited below:

**Special Thanks**

Professor Penlidis and all IPR members (and students) would like to thank the IPR Administrative Assistant, Rosemary Anderson, for continuing, exemplary service since 1986. Rosemary's contributions to the IPR "day-to-day life" are simply outstanding.

**Plan for the Next Five-Year Period**

We are very proud of the IPR awards to both graduate students and undergraduate work-term reports. Continuity of the research and teaching activities of IPR is guaranteed by (a) the increasing maturity exhibited in the last five years by its new/young members, and (b) the increased mentorship exhibited by its older, more established, members.

Some new initiatives in the next two years will include the selection of an Associate Director for IPR to work with Professor Penlidis in 2008-2010 for future continuity.

**2. ANNUAL IPR SYMPOSIUM**

The 30<sup>th</sup> Annual IPR Symposium will be held May 13, 2008. A schedule and registration forms have been circulated electronically, as usual.

Many thanks to all who participated in the 2007 Symposium (an audience of about 65 people)—IPR received very positive feedback regarding the topics covered. A list of industrial participants and the 2007 program are attached (Appendix 1).

**3. IPR INDUSTRIAL MEMBERS**

An up-to-date list of our current industrial members is attached (Appendix 2).

**4. IPR PREPRINTS**

During 2007, the IPR office sent out 31 preprints to our members (Appendix 3).

## 5. RESEARCH PROGRAMS

We have more than 60 research personnel (excluding faculty) involved in polymer research at the University of Waterloo. Industrial members may find it interesting to keep up to date with the various research projects that are underway (see list attached of research personnel, Appendix 4). For more information on any project please call the appropriate supervisor or the IPR office at 519/888-4789.

## 6. RECENTLY GRADUATED STUDENTS

### R. Dhib

MASc ChE Khazrae, P.K. Modelling and optimization of ethylene copolymerization in high pressure reactors using difunctional initiators  
Ryerson University

MASc ChE Patel, H. CFD analysis of mixing in styrene polymerization in a CSTR (Co-supervised with Dr. Ein Mozaffari, Ryerson).  
Ryerson University

MASc ME Sartipi, A. Laminar natural convection in concentric domed skylight cavities heated from inside, (Co-Supervised with Dr. D.Naylor at Ryerson, A. Laouadi at NRC).  
Ryerson University

### T.A. Duever

MASc ChE Al-Adwani, S. A hybrid neural network-mathematical programming approach to design an air quality monitoring network for an industrial complex  
Ryerson University

### J. Duhamel

Ph.D. Chem Siddique, B. Design, synthesis, and characterization of a series of self-assembling polypeptides  
Ryerson University

Ph.D. Chem Wang, M. Binding of self-assembling peptides to oligodeoxynucleotides (with Prof. Pu Chen)  
Ryerson University

### X. Feng

PhD ChE Xiao, Shude Synthesis and modification of polymer membranes for pervaporation and gas separation (currently with Queens Univ., Kingston, ON)  
Ryerson University

MASc ChE Lin, Elaine A study of the mobility of silver ions in chitosan membranes (currently with Atomic Energy Canada, Mississauga, ON)  
Ryerson University

MASc ChE Kim, Se-Jin Water-swollen sericin/PVA membranes for gas permeation (currently with Korea Research Institute of Chemical Technology, Dajong, Korea)  
Ryerson University

### N. McManus

MASc ChE Nabifar, A. Nitroxide-mediated controlled polymerization of styrene (with A. Penlidis)  
Ryerson University

### **A. Penlidis**

MASc ChE Nabifar, A. Nitroxide-mediated controlled polymerization of Styrene (with N. McManus)

PhD CivE Alvarado, J. Mathematical modeling of damage in polyethylene (with M.A. Polak)

### **J.B.P. Soares**

PhD ChE Shin, S.Y. Synthesis and characterization of polyethylene/clay nanocomposites (w/ L.C. Simon)

### **C. Tzoganakis**

PhD ChE Park, H.S. Surface tension measurement of polystyrenes in supercritical fluids

## **7. ACADEMIC MEMBERS OF THE INSTITUTE FOR POLYMER RESEARCH**

Professors: R. Dhib  
T.A. Duever  
J. Duhamel  
X. Feng  
M. Gauthier  
N. McManus  
A. Penlidis, Director  
L. C. Simon  
J.B.P. Soares  
P. Sullivan  
C. Tzoganakis  
E. Vivaldo-Lima

Please see brief description of research interests and projects, along with contact information, by visiting the following web link:

<http://www.ipruw.com/contact/faculty-ria.htm>

## **8. MEMBER COMPANIES**

Currently we have **20 member companies**: (refer also Appendix 2)

\*Andercol S.A.  
AT Plastics Inc.  
BASF AG/Corporation  
Borealis AS  
Braskem, Brazil  
Cadbury Schweppes, USA  
Canadian General Tower  
CID/DESC, Centro de Investigación Desarrollo Tecnológico, Mexico  
CIQA, Saltillo, Mexico  
Compuplast Canada Inc.  
DSM Research  
The Dow Chemical Company  
Lanxess Inc.

National Starch & Chemical  
OMNOVA Solutions Inc.  
\*PolyVation, The Netherlands  
Princeton Polymer Consultants  
SABIC EuroPetrochemicals  
Sumitomo Chemical Co., Japan  
\*Sunoco Inc.

\*New member in 2007

## **9. STUDENT AWARDS**

### **J. Duhamel**

Christine Keyes-Baig, NSERC Scholar  
Howard Siu, NSERC Scholar

### **X. Feng**

Li Liu, OGS Scholar

### **A. Penlidis**

Joy Cheng, NSERC scholar  
Afsaneh Nabifar, OGSST-OMNOVA award

### **J.B.P. Soares**

M. Al-Harhi, Park Reilly Medal

## **10. FACULTY AWARDS**

### **J. Duhamel**

Tier-2 Canada Research Chair

### **A. Penlidis**

Tier 1 Canada Research Chair  
Outstanding Performance Award, University of Waterloo, May 2007

### **E. Vivaldo Lima**

Promoted to Profesor de Carrera Titular "B" (one category below the highest, which is Titular "C"), effective April 25, 2007.

## **11. FULL REFEREED JOURNAL PAPERS**

### **R. Dhib**

Edalatmanesh M., R. Dhib, M. Mehrvar (2007). Kinetic Modeling of Phenol Degradation in Water by UV/H<sub>2</sub>O<sub>2</sub> Process. I. J. Chem. Kin., 40(1), 34-43.

Dhib, R. (2007). Infrared Drying: From Process Modeling to Advanced Process Control. Drying Technology, 25, 97-105.

Scorah, M.J., R. Dhib, A.Penlidis (2007). Recent Advances in the Study of Multifunctional Initiators in Free Radical Polymerizations. *Macromol. React. Eng.* 1, 209-221.

Scorah, M. J., C. Tzoganakis, R. Dhib, A. Penlidis (2007). Characterization by Dilute Solution and Rheological Methods of Polystyrene and Poly(methyl methacrylate) Produced with a Tetrafunctional Peroxide Initiator. *J. Appl. Polym. Sci.*, 103, 1340, 1355, 2007.

### **J. Duhamel**

Zhang, M., J. Duhamel (2007). Study of the Microcrystallization of Ethylene-Propylene Random Copolymers in Solution by Fluorescence. *Macromolecules*, 40, 661-669.

Wang, M., M. Law, J. Duhamel, P. Chen (2007). Interaction of a Self-Assembling Peptide with Oligonucleotides: Complexation and Aggregation. *Biophys. J.*, 93, 2477-2490.

Ingratta, M., J. Duhamel (2007). Correlating Pyrene Excimer Formation with Polymer Chain Dynamics in Solution. Possibilities and Limitations. *Macromolecules*, 40, 6647-6657.

### **X. Feng**

Francisco, G.J., A. Chakma, X. Feng (2007). Membranes comprising of alkanolamines incorporated into poly(vinyl alcohol) matrix for CO<sub>2</sub>/N<sub>2</sub> separation. *J. Membrane Sci.*, 303, 54-63.

Xiao, S., X. Feng, R.Y.M. Huang (2007). Trimesoyl chloride crosslinked chitosan membranes for CO<sub>2</sub>/N<sub>2</sub> separation and pervaporation dehydration of isopropanol. *J. Membrane Sci.*, 306, 36-46.

Xiao, S., R.Y.M. Huang, X. Feng (2007). Synthesis and properties of 6FDA-MDA copolyimide membranes: Effects of diamines and dianhydrides on gas separation and pervaporation properties. *Macromol. Chem. Phys.*, 208, 2665-2676.

Mujiburohman M., X. Feng (2007). Permselectivity, solubility and diffusivity of propyl propionate/water mixtures in poly(ether block amide) membranes. *J. Membrane Sci.*, 300, 95-103.

Xiao, S., X. Feng, R.Y.M. Huang (2007). Investigation of sorption properties and pervaporation behaviors under different operating conditions for trimesoyl chloride-crosslinked PVA membranes, *J. Membrane Sci.*, 302, 36-44.

Gimenes, M.L., L. Liu, X. Feng (2007). Sericin/poly(vinyl alcohol) blend membranes for pervaporation separation of water/ethanol mixtures. *J. Membrane Sci.*, 295, 71-79.

Xiao, S., R.Y.M. Huang, X. Feng (2007). Synthetic 6FDA-ODA copolyimide membranes for gas separation and pervaporation: Functional groups and separation properties. *Polymer*, 48, 5355-5368.

Du, R., A. Chakma, X. Feng (2007). Interfacially formed poly(N,N-dimethylaminoethyl methacrylate)/polysulfone composite membranes for CO<sub>2</sub>/N<sub>2</sub> separation. *J. Membrane Sci.*, 290, 19-28.

Zhu, Z., X. Feng, A. Penlidis (2007). Layer-by-layer self assembled polyelectrolyte membranes for solvent dehydration by pervaporation. *Mat. Sci. Eng. C*, 27, 612-619.

### **M. Gauthier**

Teertstra, S. J., M. Gauthier (2007). Viscoelastic Properties of Arborescent Polystyrene-graft-polyisoprene Copolymers. *Macromolecules*, 40, 1657-1666.

Gauthier, M. (2007). Arborescent Polymers and Other Dendrigrft Polymers: A Journey Into Structural Diversity. *J. Polym. Sci., Part A: Polym. Chem.*, 45, 3803-3810.

Yuan, Z., M. Gauthier (2007). Synthesis of Arborescent Copolymers by a One-pot Method. *Macromol. Chem. Phys.*, 208, 1615-1624.

### **N. McManus**

Psarreas, A., C. Tzoganakis, N.T. McManus, A. Penlidis (2007). Nitroxide Mediated Controlled Degradation of Polypropylene. *Polymer Eng. Sci.*, 47, 2118-2123.

Zhu, S., N.T. McManus, C. Tzoganakis, A. Penlidis (2007). Effect of a Poly(dimethylsiloxane) modified polyolefin additive on the processing and surface properties. *Polym. Eng Sci.* 2007, 47, 1309 - 1316 .

Dias, R.S., M.C. Gonçalves, L.M.F Lona, E. Vivaldo-Lima, N.T. McManus, A. Penlidis (2007). Nitroxide-mediated radical polymerization of styrene using mono- and di-functional initiators. *Chem. Eng. Sci.* 2007, 62, 5240-5244.

Ximenes, J.B., P.V.R. Mesa, L.M.F. Lona., E. Vivaldo-Lima, N.T. McManus, A. Penlidis (2007). Simulation of Styrene Polymerization by Monomolecular and Bimolecular Nitroxide-Mediated Radical Processes Over a Range of Reaction Conditions. *Macromolecular Theory and Simulation*. 16, 194 - 208.

McManus, N.T., A. Penlidis (2007). NMR analysis of butyl acrylate-methyl methacrylate-alpha methyl styrene terpolymers. *J. Appl. Polym. Sci.* 103, 2093-2098.

### **A. Penlidis**

Scorah, M.J., R.Dhib and A. Penlidis (2007). Recent advances in the study of multifunctional initiators in free radical polymerizations. **Feature article**, *Macromol. React. Eng.*, 1, 209-221.

Zhu, S.-H., N.T. McManus, C. Tzoganakis and A. Penlidis (2007). Effect of a poly(dimethylsiloxane) modified polyolefin additive on the processing and surface properties of LLDPE. *Polym. Eng. Sci.*, 47 (9), 1309-1316.

Psarreas, A., C. Tzoganakis, N.T. McManus and A. Penlidis (2007). Nitroxide-mediated controlled degradation of polypropylene. *Polym. Eng. Sci.*, 47 (12), 2118-2123.

Dias, R.S., M.C. Goncalves, L.M.F. Lona, E. Vivaldo-Lima, N.T. McManus and A. Penlidis (2007). Nitroxide-mediated radical polymerization of styrene using mono-and di-functional initiators. *Chem. Eng. Sci.*, 62, 5240-5244.

Ximenes, J.B., P.V.R. Mesa, L.M.F. Lona, E. Vivaldo-Lima, N.T. McManus and A. Penlidis (2007). Simulation of styrene polymerization by monomolecular and bimolecular nitroxide-mediated radical processes over a range of reaction conditions. *Macromol. Theory Simul.*, 16, 194-208.

Alvarado-Contreras, J., M.A. Polak and A. Penlidis (2007). Micromechanical approach to modelling damage in crystalline polyethylene. *Polym. Eng. Sci.*, 47 (4), 410-420.

Roa-Luna, M., A. Nabifar, M.P. Diaz-Barber, N.T. McManus, E. Vivaldo-Lima, L.M.F. Lona and A. Penlidis (2007). Another perspective on the nitroxide-mediated radical polymerization of styrene using TEMPO and dibenzoyl peroxide. *J. Macromol. Sci., Pure Appl. Chem.*, 44 (3), 337-349.

Roa-Luna, M., M.P. Diaz-Barber, E. Vivaldo-Lima, L.M. F. Lona, N. T. McManus and A. Penlidis (2007). Assessing the importance of diffusion-controlled effects on polymerization rate and molecular weight development in nitroxide-mediated radical polymerization of styrene. *J. Macromol. Sci., Pure Appl. Chem.*, 44 (2), 193-203.

Quintero-Ortega, I.A., E. Vivaldo-Lima, R.B. Gupta, G. Luna-Barcenas and A. Penlidis (2007). Modelling of the homogeneous free-radical copolymerization kinetics of fluoromonomers in carbon dioxide at supercritical conditions. *J. Macromol. Sci., Pure Appl. Chem.*, 44 (2), 205-213.

McManus, N.T. and A. Penlidis (2007). NMR analysis of butyl acrylate-methyl methacrylate-alpha methyl styrene terpolymers. *J. Appl. Polym. Sci.*, 103, 2093-2098.

Zhu, Z., X. Feng and A. Penlidis (2007). Layer-by-layer self-assembled polyelectrolyte membranes for solvent dehydration by pervaporation. *Mat. Sci. Eng., C* 27, 612-619.

Scorah, M.J., C. Tzoganakis, R. Dhib and A. Penlidis (2007). Characterization by dilute solution and rheological methods of polystyrene and poly(methyl methacrylate) produced with a tetrafunctional peroxide initiator. *J. Appl. Polym. Sci.*, 103 (2), 1340-1355.

### **J.B.P. Soares**

Sarzotti, DM, DJ Marshman, WE Ripmeester, JBP Soares (2007). A kinetic study of metallocene-catalyzed ethylene polymerization using different aluminoxane cocatalysts. *J Polym Sci: Part A: Polym Chem.*, 45, 1677-1690.

Franceschini, FC, TT da R. Tavares, JHZ dos Santos, JBP Soares, ML Ferreira (2007). Comparative study of propylene polymerization using  $\text{Me}_2\text{Si}(\text{RInd})_2\text{ZrCl}_2/\text{SiO}_2\text{-SMAO}/\text{AIR}_3$  and  $\text{Me}_2\text{Si}(\text{RInd})_2\text{ZrCl}_2/\text{MAO}$  (R = Me, H). *Polymer*, 48, 1940-1953.

Al-Harhi, M., A Sardashti, JBP Soares, LC Simon (2007). Atom transfer radical polymerization (ATRP) of styrene and acrylonitrile with monofunctional and bifunctional initiators. *Polymer*, 48, 1954-1961.

Soares, JBP, AE Hamielec (2007). Chain length distributions of polyolefins made with single-site catalysts at very short polymerization times – Analytical solution and Monte Carlo simulation. *Macromol React Eng*, 1, 53-67.

Al-Harhi, M., JBP Soares, LC Simon (2007). Dynamic Monte Carlo simulation of ATRP with bifunctional initiators. *Macromol React Eng*, 1, 95-105.

Maneshi, A, JBP Soares, LC Simon (2007). A single-gallery model for the in-situ production of polyethylene-clay nanocomposites. *Macromol Symp*, 243, 277-286.

Anantawaraskul, S, P Jirachaithorn, JBP Soares, J Limtrakul (2007). Mathematical modeling of crystallization analysis fractionation (Crystaf) of ethylene/1-hexene copolymers. *J Polym Sci: Part B: Polym Phys*, 45, 1010-1017.

Maafa, IM, JBP Soares, E Alkamel (2007). Prediction of chain length distribution of polystyrene made in batch reactors with bifunctional free-radical initiators using dynamic Monte Carlo simulation. *Macromol React Eng*, 1, 364-383.

Al-Harhi, M, LS Cheng, JBP Soares, LC Simon (2007). Atom-transfer polymerization of styrene with bifunctional and monofunctional initiators: Experimental and mathematical modeling results. *J Polym Sci: Part A: Polym Chem*, 45, 2212-2224.

Stapleton, RA, J Chai, A Nuanthanom, Z Flisak, M Nele, T Ziegler, PL Rinaldi, JBP Soares, S Collins (2007). Synthesis of low density polyethylene using nickel iminophosphonoamide complexes. *Macromolecules*, 40, 2993-3004.

Anatawaraskul, S, JBP Soares, P Jirachaithorn (2007). A mathematical model for the kinetics of crystallization in Crystaf. *Macromol Symp*, 257, 94-102.

Paredes, B, JBP Soares, R van Grieken, A Carrero, I Suarez (2007). Characterization of ethylene-1-hexene copolymers made with metallocene catalysts: Influence of support type. *Macromol Symp*, 257, 103-111.

Soares, JBP (2007). An overview of important microstructural distributions for polyolefin analysis. *Macromol Symp*, 257, 1-12.

Valencia, FP, JBP Soares (2007). Steady state simulation of ethylene polymerization using multiple-site coordination catalysts. *Macromol Symp*, 259, 110-115.

### **C. Tzoganakis**

Psarreas, A., C. Tzoganakis, N. McManus, A. Penlidis (2007). Nitroxide-Mediated Controlled Degradation of Polypropylene. *Polym. Eng. Sci.*, 47, 2118-2123.

Li, Q., C. Tzoganakis (2007). Functionalization of Polypropylene with Sulfonyl Azide through Reactive Processing. *Intern. Polymer Processing*, XXII, 311-319.

Park, H., C.B. Park, C. Tzoganakis, P. Chen (2007). Effect of Molecular Weight on the Surface Tension of Polystyrene Melt in Supercritical Nitrogen. *Ind. Eng. Chem. Res.*, 46 (11), 3849-3851.

Park, H., R.B. Thompson, N. Lanson, C. Tzoganakis, C.B. Park, P. Chen (2007). Effect of Temperature and Pressure on Surface Tension of Polystyrene in Supercritical Carbon Dioxide. *J. Phys.Chem. B*, 111, 3859-3868.

Zhu, S.-H, N. McManus, C. Tzoganakis , A. Penlidis (2007). Effect of a Poly(Dimethylsiloxane) Modified Polyolefin Additive on the Processing and Surface Properties of LLDPE. *Polym. Eng. Eng.*, 47(9), 1309-1316.

Scorah, M.J., C. Tzoganakis, R. Dhib and A. Penlidis (2007). Characterization by Dilute Solution and Rheological Methods of Polystyrene and Poly (Methyl Methacrylate) Produced with a Tetrafunctional Peroxide Initiator. *J. Appl. Polym. Sci.*, 103, 1340-1355.

### **E. Vivaldo Lima**

Roa-Luna, M., M.P. Díaz-Barber, E. Vivaldo-Lima, L.M.F. Lona, N.T. McManus, A. Penlidis (2007). Assessing the Importance of Diffusion-Controlled Effects on Polymerization Rate and Molecular Weight Development in Nitroxide-Mediated Radical Polymerization of Styrene. *J. Macromol. Sci., A: Pure Appl. Chem.*, 44(2), 192-203.

Quintero-Ortega, I.A., E. Vivaldo-Lima, R.B. Gupta, G. Luna-Bárceñas, A. Penlidis (2007). Modeling of the Homogeneous Free-Radical Copolymerization Kinetics of Fluoromonomers in Carbon Dioxide at Supercritical Conditions. *J. Macromol. Sci., A: Pure Appl. Chem.*, 44(2), 205-213.

Roa-Luna, M., A. Nabifar, M.P. Díaz-Barber, N.T. McManus, E. Vivaldo-Lima, L.M.F. Lona, A. Penlidis (2007). Another Perspective on the Nitroxide-Mediated Radical Polymerization (NMRP) of Styrene Using 2,2,6,6-Tetramethyl-1-piperidinyloxy (TEMPO) and Dibenzoyl Peroxide (BPO). *J. Macromol. Sci., A: Pure Appl. Chem.*, 44(3), 337-349.

Belincanta-Ximenes, J., P.V.R. Mesa, L.M.F. Lona, E. Vivaldo-Lima, N.T. McManus, A. Penlidis (2007). Simulation of Styrene Polymerization by the Monomolecular and Bimolecular Nitroxide-Mediated Radical Processes Over a Range of Reaction Conditions. *Macromol. Theory Simul.*, 16, 194-208.

Dias, R.S., M.C. Gonçalves, L.M.F. Lona, E. Vivaldo-Lima, N.T. McManus, A. Penlidis (2007). Nitroxide-mediated radical polymerization of styrene using mono- and di-functional initiators. *Chem. Eng. Sci.*, 62, 5240-5244.

## **12. PAPERS IN FULL IN REFEREED CONFERENCE PROCEEDINGS**

### **R. Dhib**

Patel, H., F. Ein-Mozaffari, R. Dhib (2007). Effect of mixing on polymerization using CFD Approach. 21<sup>st</sup> Conference CANCEM, June 2007.

Sartipi, A., A. Laouadi, D. Naylor, R. Dhib(2007). Natural convection heat transfer within vertically eccentric domed skylights cavities. 10<sup>th</sup> IBPSA Building Simulation Conference (Beijing, China), pp. 1-7, September 03, 2007.

### **M. Gauthier**

Ramirez, I., S. Jayaram, E. A. Cherney, M. Gauthier (2007). Improving the Dispersion of Nanofillers in Silicone Polymers by Surface Treatment. Proc. ESA Ann. Meeting Electrostatics, 131-143.

Ramirez, I., E. A. Cherney, S. Jayaram, M. Gauthier (2007). Silicone Rubber Nanocomposites for Outdoor Insulation Applications. Proc. IEEE Conf. Elec. Insul. Diel. Phenom. 15, 384-387.

### **N. McManus**

Psarreas, A., N.T. McManus, C. Tzoganakis, A. Penlidis (2007). Nitroxide-mediated controlled degradation of Polypropylene. Society of Plastics Engineers Annual Technical Conference 2007.

Zhu, S., N.T. McManus, C. Tzoganakis, A. Penlidis (2007). Effect of a Polydimethylsiloxane Polyolefin additive on the extrusion of LLDPE. Society of Plastics Engineers Annual Technical Conference 2007.

### **A. Penlidis**

Zhu, S.-H., N.T. McManus, C. Tzoganakis and A. Penlidis (2007). Effect of a polydimethylsiloxane-modified polyolefin additive on the processing and surface properties of LLDPE. ANTEC 2007, May 6-10, 2007, Cincinnati, OH, USA.

Psarreas, A., N.T. McManus, C. Tzoganakis and A. Penlidis (2007). Nitroxide-mediated controlled degradation of polypropylene. ANTEC 2007, May 6-10, 2007, Cincinnati, OH, USA.

### **J.B.P. Soares**

Soares, JBPS (2007). Dynamic Monte Carlo simulation of olefin polymerization in stopped-flow reactors. 5<sup>th</sup> International Workshop on Heterogeneous Ziegler-Natta Catalysts, JAIST, Ishikawa, Japan, March 18-21, 2007.

### **C. Tzoganakis**

Psarreas, A., C. Tzoganakis, N. McManus, A. Penlidis (2007). Nitroxide-Mediated Controlled Degradation of Polypropylene. 65th Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp.2666-2670.

Li, Z., C. Tzoganakis (2007). Extrusion and Spinning of Nylon-6,6 / Supercritical Carbon Dioxide Mixtures. 65th Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp.521-525.

Zhu, S-H., C. Tzoganakis (2007). Surface Properties of Hydrosilylated Polyolefins Annealed in Supercritical Carbon Dioxide. 65th Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp.2699-2703.

Zhu, S-H., N. McManus, C. Tzoganakis, A. Penlidis (2007). Effect of a Poly(Dimethylsiloxane) Modified Polyolefin Additive on the Processing and Surface Properties of LLDPE. 65th Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp.2704-2708.

Park, H., C.B. Park, C. Tzoganakis, P. Chen (2007). Effect of Temperature and Pressure on Surface Tension of Polystyrene in Supercritical Carbon Dioxide. 65th Annual Technical Conference of the Society of Plastics Engineers, Cincinnati, OH, USA, pp. 3090-3099.

### 13. CONFERENCE PRESENTATIONS

#### **T.A. Duever**

Duever, T.A., A. Penlidis, Parameter Estimation in Multi-response Problems for the Modelling of Multicomponent Polymerizations. Vingtiemes Entretiens du Centre Jacques Cartier, Modelling, Monitoring and Control of Polymer Properties, Lyon, France, December 1-5, 2007.

#### **J. Duhamel**

Ingratta, M., J. Duhamel (2007). Pyrene Excimer Formation with Polymer Chain Dynamics in Solution, Possibilities and Limitations. 33<sup>rd</sup> Canadian High Polymer Forum, Aylmer, Québec, August 26-29, 2007.

#### **X. Feng**

Feng, X. (2007). Poly(ether-b-amide) membranes for gas separation and pervaporation. **Keynote Lecture**, 57th Canadian Chemical Engineering Conference, Edmonton, AB, Oct 28-31, 2007.

Du, R., A. Chakma, X. Feng (2007). Pervaporation dehydration of ethylene glycol by interfacially formed poly(N,N-dimethylaminoethyl methacrylate)/polysulfone composite membranes. 18th Annual North American Membrane Society Meeting, Orlando, FL, May 12-16, 2007.

Sun, A.C., W. Kosar, X. Feng. Preparation and characterization of poly(vinylidene fluoride) hollow fiber membranes. 18th Annual North American Membrane Society Meeting, Orlando, FL, May 12-16, 2007.

#### **M. Gauthier**

Dockendorff, J., M. Gauthier (2007). Arborescent Polymers as Templates for the Preparation of Gold Nanoparticles. 5<sup>th</sup> International Dendrimers Symposium, August 2007, Toulouse, France.

Teertstra, S. J., F. Moingeon, M. Gauthier (2007). Polymer Processing Additives Based on Highly Branched (Arborescent) Graft Polymers. 7<sup>th</sup> Advanced Polymers Via Macromolecular Engineering Conference, December 2007, Miami Beach, FL.

Dockendorff, J., M. Gauthier (2007). Arborescent Polymers as Templates for the Preparation of Metallic Nanoparticles. Nanoforum Canada, June 2007, Waterloo, ON.

Nguon, O., M. Gauthier (2007). Polymer-stabilized Nickel Nanoparticles. Nanoforum Canada, June 2007, Waterloo, ON.

Ramirez, I., S. Jayaram, E. A. Cherney, M. Gauthier (2007). Improving the Dispersion of Nanofillers in Silicone Polymers by Surface Treatment. ESA Annual Meeting on Electrostatics, June 2007, West Lafayette, IN.

Lin, W.-Y., M. Gauthier (2007). Arborescent Copolymers as Processing Additives. 33<sup>rd</sup> Canadian High Polymer Forum, August 2007, Gananoque, ON.

Moingeon, F., S. J. Teertstra, M. Gauthier (2007). Polymer Processing Additives Based on Highly Branched (Arborescent) Graft Homopolymers. 33<sup>rd</sup> Canadian High Polymer Forum, August 2007, Gananoque, ON.

Munam, A., M. Gauthier (2007). Synthesis of 1,4-Polybutadiene Arborescent Polymer-Dendrimer Hybrids. 33<sup>rd</sup> Canadian High Polymer Forum, August 2007, Gananoque, ON.

Whitton, G., M. Gauthier. Amino Acids in the Synthesis of Branched Polymers for Controlled Drug Delivery Applications. 33<sup>rd</sup> Canadian High Polymer Forum, August 2007, Gananoque, ON.

Ramirez, I., E. A. Cherney, S. Jayaram, M. Gauthier (2007). Silicone Rubber Nanocomposites for Outdoor Insulation Applications. IEEE Conference on Electrical Insulation and Dielectric Phenomena, October 2007, Vancouver, BC.

#### **A. Penlidis**

Duever, T.A., A. Penlidis (2007). Estimation of reactivity ratios using triad fractions. 20<sup>th</sup> Conf. Centre Jacques Cartier, December 3-5, 2007, Lyon, France.

Zhu, S.-H., N.T. McManus, C. Tzoganakis, A. Penlidis (2007). Polymer property improvement using effective processing aids: A case study. 20<sup>th</sup> Conf. Centre Jacques Cartier, **Invited Talk**, December 3-5, 2007, Lyon, France.

#### **J.B.P. Soares**

Soares, JBP (2007). Simulation studies on the microstructure of high-performance specialty polyolefins with branch-block and block topologies. XI International Macromolecular Colloquium, Gramado, RS, Brazil, April 22-25, 2007.

Soares, JBP (2007). Microstructural details of branched-olefin and linear-olefin block copolymers: A theoretical comparison. Advances in Polyolefins, Santa Rosa, CA, USA, September 23-26, 2007.

Shin, SY, LC Simon, JBP Soares, G Scholz, TF McKenna (2007). Gas phase ethylene polymerization using metallocene/clays. Advances in Polyolefins, Santa Rosa, CA, USA, September 23-26, 2007.

Shin, SY, JBP Soares, LC Simon (2007). Thermal and mechanical properties of PE-clay hybrid nanocomposites made with in-situ polymerization. JAIST Nanotech 2007, 1<sup>st</sup> International Symposium on Ultimate Stability of Nano-Structured Polymers and Composites. Ishikawa, Japan, October 11-13, 2007.

Shin, SY, A Finkle, LC Simon, JBP Soares, W Rodgers, P Fasulo, G Scholz (2007). Structure of propylene-clay nanocomposites. 4<sup>th</sup> International Symposium on Polymer Nanocomposites, Montreal, Quebec, Canada, October 18-19, 2007.

Maneshi, A., LC Simon, JBP Soares (2007). Effect of polymerization conditions on particle morphology of polyethylene-clay nanocomposites. 4<sup>th</sup> International Symposium on Polymer Nanocomposites, Montreal, Quebec, Canada, October 18-19, 2007.

Peréz Valencia, F., JBP Soares (2007). Steady state simulation of polyethylene production using multiple-site coordination catalysts in an industrial process with two CSTRs in series. 9<sup>th</sup> International Workshop on Polymer Reaction Engineering, Hamburg, Germany, October 7-10, 2007.

### **E. Vivaldo Lima**

Jaramillo-Soto, G., P.R. García-Morán, E. Vivaldo-Lima (2007). Polimerización Radicálica Controlada tipo RAFT en CO<sub>2</sub> en Condiciones Supercríticas (RAFT Polymerization in Supercritical CO<sub>2</sub>). XX Congreso Nacional de la Sociedad Polimérica de México, Guanajuato, Guanajuato, México, October 30-November 2, 2007.

Quintero-Ortega, I.A., G. Jaramillo-Soto, P.R. García-Morán, E. Vivaldo-Lima (2007). Comparación de Modelos para la Polimerización en CO<sub>2</sub> en Condiciones Supercríticas (Comparison of Kinetic Models for Dispersion Polymerization in Supercritical CO<sub>2</sub>). XX Congreso Nacional de la Sociedad Polimérica de México, Guanajuato, Guanajuato, México, October 30-November 2, 2007.

García-Moran, P.R., G. Jaramillo-Soto, E. Vivaldo-Lima, Copolimerización de estireno-divinilbenceno en dióxido de carbono en condiciones supercríticas (Copolymerization of Styrene/Divinylbenzene in Supercritical Carbon Dioxide). XX Congreso Nacional de la Sociedad Polimérica de México, Guanajuato, Guanajuato, México, October 30-November 2, 2007.

## **14. INVITED SEMINARS**

### **J. Duhamel**

Duhamel, J. (2007). Bridging the Macroscopic to Molecular Divide using Fluorescence: Application to the Study of Associative Thickeners. DOW Chemical Research Center, Midland, Michigan, February 9<sup>th</sup>, 2007.

Duhamel, J. (2007). Bridging the Macroscopic to Molecular Divide using Fluorescence: Application to the Study of Associative Thickeners. University Complutense, Madrid, Spain, April 10<sup>th</sup>, 2007.

Duhamel, J. (2007). Long Range Motions of Polymers in Solution Studied by Fluorescence. University of Santiago de Compostela, Spain, April 11<sup>th</sup>, 2007; University of Lugo, Spain, April 12<sup>th</sup>, 2007.

Ingratta, M., H. Siu; J. Duhamel, (2007). New Developments in the Study of Pyrene Labeled Polymers in Solution. XVI International Materials Research Congress, Cancun, October 28-November 1, 2007.

Duhamel, J., (2007). Using Pyrene Excimer Formation to Study Long Range Polymer Chain Dynamics in Solution. Universidad Nacional Autónoma de México, Mexico City, October 31<sup>st</sup>, 2007.

### **X. Feng**

Feng, X. (2007). Development of poly(vinylidene fluoride) hollow fiber membranes. Hyflux Filtech (Shanghai) Co Ltd, Shanghai, China, Sept 21, 2007.

Feng, X. (2007). Integrated pervaporation/reactive distillation for esterification applications. Zhejiang Sci-Tech University, Hangzhou, China, Sept 18, 2007.

Feng, X. (2007). Recent advances in membrane gas separation and pervaporation. Water Treatment Technology Center, State Oceanic Administration of China, Hangzhou, China, Sept 18, 2007.

### **M. Gauthier**

Gauthier, M. (2007). Dendritic Graft Polymers: Synthesis and Applications. 1<sup>st</sup> Lanxess Butyl Rubber R&D Symposium, Sarnia, ON, June 2007.

Gauthier, M. (2007). Applications des Copolymères Arborescents Amphiphiles en Microencapsulation. Université de Montréal, Montréal, QC, July 2007.

### **A. Penlidis**

A. Penlidis, Investigation of novel tetra-functional initiators for free-radical polymerization, University of Alberta, Dept. of Chemical Engineering, **Invited Talk**, August 2007.

Zhu, S-H, N.T. McManus, C. Tzoganakis and A. Penlidis (2007). Polymer property improvement using effective processing aids: A case study. 20<sup>th</sup> Conf. Centre Jacques Cartier, **Invited Talk**, December 3-5, 2007, Lyon, France.

### **J.B.P. Soares**

Soares, JBP (2007). Polymer reaction engineering at the University of Waterloo: An overview of projects and methods. Braskem, Triunfo, RS, Brazil, March 26, 2007.

Soares, JBP (2007). Modeling the microstructure of block and graft-block copolymers using dynamic Monte Carlo simulation. Dow Chemical, Freeport, Texas, USA, March 29, 2007.

Soares, JBP (2007). Analysis and synthesis of olefin block copolymers. Dow Chemical, Freeport, Texas, USA, March 29, 2007.

Soares, JBP (2007). Microstructural details of branched- and linear-olefin block copolymers: A comparison of BOBC vs. LOBC using Monte Carlo simulation, ExxonMobil, Baytown, Texas, USA, May 8, 2007.

Soares, JBP (2007). Challenges in polymer reaction engineering. The Polyolefin Scenario. Total Petrochemicals, Deer Park, Texas, USA, May 31, 2007.

Soares, JBP (2007). Polyolefin reaction engineering. Current status and future challenges. Petrobras, Rio de Janeiro, RJ, Brazil, June 21, 2007.

Soares, JBP (2007). Microstructural modeling of polyolefins made with two single-site catalysts: Resins with bimodal MWD and CCD, branched-olefin and linear-olefin block copolymers. Symyx, Santa Clara, CA, USA, September 26, 2007.

Soares, JBP (2007). Microstructural modeling of branched-block and linear-block polyolefins made with two single-site catalysts. Queen's University, Kingston, ON, November 16, 2007.

### **C. Tzoganakis**

Tzoganakis, C. (2007). Chemical Modification of Polymers through Reactive Extrusion. Troubleshooting Polymerizations, Tools for Polymerization Troubleshooting: A case study and problem-solving approach, 29th North American Intensive Short Course, IPR, Waterloo, Ontario, June 11- 13, 2007.

### **E. Vivaldo-Lima**

Vivaldo-Lima, E. (2007). Polimerización Radicálica Controlada en Masa y Dispersión: Simulación y Estudios Experimentales (Controlled Radical Polymerization in Homogeneous and Heterogeneous Phases: Experimental and Simulation Studies). Departamento de Ingeniería Química y Programas de Posgrado en Ingeniería Química, Universidad de Guanajuato, Guanajuato, Guanajuato, México, May 18, 2007.

## **15. PATENTS/MAJOR TECHNICAL REPORTS/CHAPTERS IN BOOKS**

### **J. Duhamel**

Law, M., M. Wang, J. Duhamel, P. Chen (2007). Peptide - Nucleic Acid complexes for Therapeutic Nucleic Acid Delivery. Encyclopedia of Nanoscience and Nanotechnology.

### **A. Penlidis**

Hutchinson, R.A. and A. Penlidis (2007). Free radical polymerization: Homogeneous. Chapter 3, pgs. 118-178, in Polymer Reaction Engineering, J.M. Asua (Editor), Blackwell Publishing.

Penlidis, A. (2007). Use of reflux condensers/stripping tanks with butadiene, 30 pages, Nov. 8, 2007 for OMNOVA Solutions, USA.

### **J.B.P. Soares**

Soares, JBP, TF McKenna, CP Cheng. Coordination polymerization. In Polymer Reaction Engineering, JM Asua (Ed.), Blackwell Publishing, 2007, pp 29-117.

Soares, JBP. The first international conference on polyolefin characterization – Part I. The Metallocene and Single-Site Catalyst Monitor XV (11), 4-9, 2007.

Soares, JBP. The first international conference on polyolefin characterization – Part II. The Metallocene and Single-Site Catalyst Monitor XV (12), 4-10, 2007.

### **C. Tzoganakis**

Tzoganakis, C. Method of modifying crosslinked rubber, US 7,189,762 B2, 2007.

Tzoganakis, C., H. Malz. Melt phase hydrosilylation of polypropylene, US 7,247,385 B1, 2007.

## **16. OTHER HIGHLIGHTS**

Professor Dhib was the technical committee member, 3<sup>rd</sup> Int. Conf. on Thermal Engineering: Theory and Applications, May 21-23, Amman, Jordan; 21<sup>st</sup> Conference CANCEM, June 3-7, Ryerson University, Toronto, 2007; and session chair, 21<sup>st</sup> Conference CANCEM, June 3-7, Ryerson University, Toronto, 2007.

Effective October 18, 2007, E. Vivaldo-Lima was appointed "President of the Academic Subcommittee of the Chemical Engineering Knowledge Field (SACC-IQ)", of the UNAM Engineering Graduate Program. This is equivalent to a Chemical Engineering Graduate Program Coordinator position.

Many thanks to Dr. Carla McBain, a long-time friend of IPR, for coordinating many interesting interactions with OMNOVA Solutions Inc. IPR is grateful for OMNOVA's help for graduate student awards and scholarships.

Dr. Klaus-Dieter Hungenberg of BASF visited IPR on August 22, 2007, and gave a seminar on "Process Development for Polymers at BASF: A Model-based Approach".

During 2007, IPR had several interactions with non-member companies like: MaxTech, Waterloo, ON; LS Polymer Technology, Germany; WPI Solutions, PA, USA, and offered assistance to many graduate students from departments other than Chemical Engineering and Chemistry: Mechanical Engineering, UW; Conestoga College, Waterloo, ON; Electrical Engineering UW; and Civil Engineering, UW.

Professor Soares is a co-organizer for the 4<sup>th</sup> International Conference on the Reaction Engineering of Polyolefins (Incorep IV), Montreal, Quebec, Canada, June 22-27, 2008, and the 2<sup>nd</sup> International Conference on Polyolefin Characterization, Valencia, Spain, September 14-17, 2008.

IPR is heavily involved in the co-organization of Polymer Reaction Engineering (PRE 7) conference, May 3-8, 2009, Niagara Falls, Ontario.

Professor Soares is a Member of the Executive Advisory Board of Wiley-VCH Macromolecular Journals and responsible for the Macromolecular Reaction Engineering section of Macromolecular Materials Engineering and Associate Editor of the Brazilian Journal of Chemical Engineering.

Nanotechnology Engineering: New undergraduate engineering program BASc Nanotechnology Engineering started in Sept 05. This is a co-op program and it will deliver skills on nanoengineered polymers and materials. For more information about the skills and hiring coop students visit [www.nanotech.uwaterloo.ca](http://www.nanotech.uwaterloo.ca).

Professor Penlidis is Editorial Board Member: J. Macromol. Sci.-Pure and Appl. Chem.; Polymer-Plastics Techn. And Eng.; Macromol. React. Eng. J.

Takuji Fujisawa, a research engineer from Sumitomo, Japan, spent a special research two-year leave (2005 – 2007) with Prof. A. Penlidis working on copolymer composition control.

A fruitful collaboration between Chemical Eng. (Prof. Penlidis) and Civil Eng. (Prof. Marianna Polak) in structural characteristics of pipes (relating micro-structural properties to macro-mechanical properties and modeling of damage mechanics) has led to the formation of the “Creeps” group (three PhD students, and several MSc and undergraduate design projects), with regular meetings and research interactions, including industrial collaborators like Imperial Oil.

Professor Penlidis was co-organizer and session chair of the 20<sup>th</sup> Centre Jacques Cartier Conference on “Monitoring and Control of Polymer Properties”, December 3-5, 2007, Lyon, France. He was also organizer and lecturer of the 29<sup>th</sup> North American Industrial Course on polymerization troubleshooting (with Profs. Duever, Tzoganakis and McManus), June 11-13, 2007 at Waterloo.

INSTITUTE FOR POLYMER RESEARCH  
**CELEBRATING 23 YEARS OF OFFICIAL INSTITUTE STATUS**  
 TWENTY-NINTH ANNUAL SYMPOSIUM  
 ON POLYMER SCIENCE/ENGINEERING  
**2007**

**Conrad Grebel College**  
**Great Hall**  
**University of Waterloo, Waterloo, Ontario**  
**Tuesday, May 15, 2007**

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8:30 a.m.	<b>Coffee</b>
8:50	<b>Welcome and Opening Remarks</b>
9:00 - 9:30	<b>Jason Dockendorff, Chemistry, Waterloo</b> (2006 IPR Scholarship Winner) Arborescent amphiphilic copolymers as templates for the preparation of gold nanoparticles
9:30 - 10:00	<b>Muhammad Mujiburohman, Chemical Engineering, Waterloo</b> Poly(ether block polyamide) membranes for recovery of propyl propionate from aqueous solution by pervaporation
10:00 - 10:30	<b>Mohammad Al-Saleh, Chemical Engineering, Waterloo</b> Modeling olefin polymerization using Monte Carlo simulation: detailed comonomer distribution
10:30 - 11:00	<b>Coffee</b>
11:00 - 11:30	<b>Afsaneh Nabifar, Chemical Engineering, Waterloo</b> Investigating the nitroxide-mediated radical polymerization (NMRP) of styrene over a range of reaction conditions
11:30 - 12:00 p.m.	<b>Greg Whitton, Chemistry, Waterloo</b> Amino acids for the synthesis of branched polymers for controlled drug delivery applications
12:15 - 1:00	<b>Lunch</b>
1:00 - 2:00	<b>Dr. John Perdikoulis, Compuplast Canada Inc.</b> Solving polymer processing problems with computer simulation
2:00 - 2:30	<b>Jose Alvarado-Contreras, Civil Engineering, Waterloo</b> Micromechanical modelling of damage at large deformation in semicrystalline polyethylene
2:30 - 3:00	<b>Haresh Patel, Chemical Engineering, Ryerson</b> CFD analysis of mixing in polymerization reactor

- 3:00 - 3:30           **Coffee**
- 3:30 - 4:00           **Abolfazl Maneshi, Chemical Engineering, Waterloo**  
Polyethylene clay nanocomposites: modeling and experimental investigation of particle morphology
- 4:00 - 4:30           **Neda Felorzabihi, Chemical Engineering, Toronto**  
Fluorescence resonance energy transfer (FRET) in polymer films and polymer blends
- 4:30 - 5:00           **Saeid Mehdiabadi, Chemical Engineering, Waterloo**  
Simulation of polymerization and long chain branch formation in a semi-batch reactor using two single-site catalysts
- 5:00                   **Closing remarks**
- 6:00 - 7:30           **IPR Industrial Member DINNER**  
University Club, Main Dining Room
- 7:30 - 9:30           **Poster Presentations and Informal Get-together**  
University Club, Main Dining Room  
(IPR graduate students/researchers and symposium participants)

**POSTER SESSION  
TUESDAY MAY 15, 2007  
UNIVERSITY CLUB  
7:30 pm**

Ahmad Al-Shaiban Chem Eng, Waterloo	Simulation of propylene polymerization in laboratory reactors
Joy Cheng/Jose Alvarado Chem Eng/Civil Eng, Waterloo	Relating micromolecular properties of polyethylene with its environmental stress cracking resistance
Woosung Jung Chem Eng, Waterloo	Mathematical modeling of industrial multicomponent recipes for batch/semi-batch free-radical bulk/solution polymerization: styrene/acrylate/methacrylate/hydroxy(alkyl)acrylate
Paula Kruger Chem Eng, Waterloo	Agro-Fiber Thermoplastic Composites: Structure and Properties of PP/Wheat Straw
Aaron Law Chem Eng, Waterloo	Characterization of Microscale Deformations due to Creep in Glass-Mat Thermoplastic (GMT) Composites at Elevated Temperature
Afsaneh Nabifar Chem Eng, Waterloo	Assessing the importance of diffusion-controlled effects on nitroxide-mediated radical polymerization (NMRP) of styrene
Yulin Wang Chemistry, Waterloo	Effect of crosslinking density on excimer formation in pyrene-labeled poly(N,N-dimethylacrylamide) gels
Ian Washington Chem Eng, Waterloo	Emulsion co-polymerization modelling for the production of nitrile rubber in a continuous reactor train

**TWENTY-NINTH ANNUAL SYMPOSIUM  
ON POLYMER SCIENCE/ENGINEERING  
May 15, 2007--CONRAD GREBEL COLLEGE  
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**TWENTY-NINTH ANNUAL SYMPOSIUM  
ON POLYMER SCIENCE/ENGINEERING  
May 15, 2007--CONRAD GREBEL COLLEGE  
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## PREPRINTS 2007

- 07/001 **Nitroxide-mediated controlled degradation of polypropylene**  
A. Psarreas, N. McManus, C. Tzoganakis, A. Penlidis  
Antec 2007, Acc., 01/07
- 07/002 **Effect of a polydimethylsiloxane-modified polyolefin additive on the extrusion of LLDPE**  
S.-H. Zhu, N.T. McManus, C. Tzoganakis, A. Penlidis  
Antec 2007, Acc., 01/07
- 07/003 **Viscoelastic Properties of Arborescent Polystyrene-graft-polyisoprene copolymers**  
S.J. Teertstra, M. Gauthier  
Macromolecules, Acc., 01/07
- 07/004 **Recent advances in the study of multifunctional initiators in free radical polymerizations**  
M.J. Scolah, R. Dhib, A. Penlidis  
Macromol. React. Eng., Acc., 12/06
- 07/005 **Synthesis of low density poly(ethylene) using nickel iminophosphonamide complexes**  
R.A. Stapleton, J. Chai, A. Nuanthanom, Z. Flisak, M. Nele, T. Ziegler, P.L. Rinaldi, J.B.P. Soares, S. Collins  
Macromolecules, Acc., 01/07
- 07/006 **Comparative study of propylene polymerization using  $\text{Me}_2\text{Si}(\text{RInd})_2\text{ZrCl}_2/\text{SiO}_2\text{-SMAO}/\text{AIR}_3$  and  $\text{Me}_2\text{Si}(\text{RInd})_2\text{ZrCl}_2/\text{MAO}$  (R=Me, H)**  
F.C. Franceschini, T.T. da R. Tavares, J.H.Z. dos Santos, J.B.P. Soares, M.L. Ferreira  
Polymer, in print, 02/07
- 07/007 **Atom-transfer radical polymerization of styrene with bifunctional and monofunctional initiators: experimental and mathematical modelling results**  
M. Al-Harhi, L.S. Cheng, J.B.P. Soares, L.C. Simon  
J. Polym. Sci., Part A: Polym. Chemistry, Acc., 01/07
- 07/008 **Prediction of chain length distribution of polystyrene made in batch reactors with bifunctional free-radical initiators using dynamic Monte Carlo simulation**  
I.M. Maafa, J.B.P. Soares, A. Elkamel  
Macromol. React. Eng, Acc., 03/07
- 07/009 **Effect of a poly(dimethylsiloxane) modified polyolefin additive on the processing and surface properties of LLDPE**  
S.-H. Zhu, N.T. McManus, C. Tzoganakis, and A. Penlidis  
Polym. Eng. Sci., Acc., 03/07
- 07/010 **Mathematical modelling of atom transfer radical copolymerization**  
M. Al-Harhi, J.B.P. Soares, L.C. Simon  
Macromol. React. Eng., Acc., 04/07

- 07/011      **Synthesis of arborescent copolymers by a one-pot method**  
Z. Yuan, M. Gauthier  
Macromol. Chem. And Phys., Acc., 04/07
- 07/012      **Functionalization of polypropylene with sulfonyl azide through reactive processing**  
Q. Li and C. Tzoganakis  
Intern'l Polym. Processing, Acc., 04/07
- 07/013      **Effect of temperature and pressure on surface tension of polystyrene in supercritical carbon dioxide**  
H. Park, R.B. Thompson, N. Lanson, C. Tzoganakis, C.B. Park, P. Chen  
J. Physical Chem. B, Acc., 04/07
- 07/014      **Effect of molecular weight on the surface tension of polystyrene melt in supercritical nitrogen**  
H. Park, C.B. Park, C. Tzoganakis, P. Chen  
Ind. Chem. Res. Acc., 04/07
- 07/015      **Arborescent polymers and other dendrigraft polymers: A journey into structural diversity**  
M. Gauthier  
J. Poly. Sci. A: Poly. Chem, Acc., 05/07
- 07/016      **An overview of important microstructural distributions for polyolefin analysis**  
J.B.P. Soares  
Macomol. Symp., Acc., 05/07
- 07/017      **A mathematical model for the kinetics of crystallization in crystaf**  
S. Anantawaraskul, J.B.P. Soares, P. Jirachaithjhorn  
Macomol. Symp., Acc., 05/07
- 07/018      **Characterization of ethylene-1-hexene copolymers made with supported metallocene catalysts: influence of support type**  
B. Paredes, J.B.P. Soares, R. van Grieken, A. Carerro, I. Suarez  
Macomol. Symp., Acc., 05/07
- 07/019      **Correlating pyrene excimer formation with polymer chain dynamics in solution. Possibilities and limitations.**  
M. Ingratta and J. Duhamel  
Macomol., Acc., 06/07
- 07/020      **Dynamic Monte Carlo simulation of olefin polymerization in stopped-flow reactors**  
J.B.P. Soares and T. Nguyen  
Macomol Symp., Acc., 08/07
- 07/021      **Nitroxide-mediated controlled degradation of polypropylene**  
A. Psarreas, C. Tzoganakis, N. McManus and A. Penlidis  
Polym. Eng. Sci., Acc., 08/07
- 07/022      **A practical approach to modeling time-dependent nonlinear creep behavior of polyethylene for structural applications**  
H. Liu, M.A. Polak and A. Penlidis  
Polym. Eng. Sci., Acc. 09/07

- 07/023      **Copolymer composition control policies: characteristics and applications**  
T. Fujisawa and A. Penlidis  
J. Macromol. Sci., Pure and Appl. Chem, Acc., 09/07
- 07/024      **Toward a living radical polymerization of styrene by using dithiolactones as a new type of mediating agent**  
J.G.Soriano-Moro, J.C.Rico-Valverde, F.J. Enriquez-Medrano, H.Maldonado-Textle, E. Vivaldo-Lima, R. Acosta-Ortiz and R. Guerrero- Santos  
Macromol. Rapid Comm., Acc., 10/07
- 07/025      **Steady state simulation of ethylene polymerization using multiple-site coordination catalysts**  
F.Perez Valencia and J.B.P. Soares  
Macromol. React. Eng., Acc., 10/07
- 07/026      **Nanofilled silicone dielectrics prepared with surfactant for outdoor insulation applications**  
I. Ramirez, E.A. Cherney, S. Jayaram and M. Gauthier  
IEEE Trans. Dielectr. Electr. Insul., Acc., 10/07
- 07/027      **Simulation of polymerization and long chain branch formation in a semi-batch reactor using two single-site catalysts**  
S. Mehdiabadi, J.B.P.Soares, A. H. Dekmezian  
Macromol. React. Eng., Acc., 11/07
- 07/028      **Conformation of arborescent polymers in solution by small-angle neutron scattering: segment density and core-shell morphology**  
S.I. Yun, K.-C. Lai, R.M. Briber, S.J. Teertstra, M. Gauthier, B.J. Bauer  
Macromolecules, Acc., 12/07
- 07/029      **Arborescent polystyrene-graft-poly(tert-butyl methacrylate) copolymers**  
R.A. Kee and M. Gauthier  
J. Polym. Sci., Part A: Polym. Chem., Acc., 12/07
- 07/030      **Chain length distributions of polyolefins made in stopped-flow reactors for non-instantaneous site activation**  
J.B.P. Soares and A.E. Hamielec  
Macromolecular Reaction Engineering, Acc., 12/07
- 07/031      **Structure and optical properties of natural biopolymers chitin and chitosan**  
G. Luna-Barcenas, B. Gonzalez-Campos, E.A. Elizalde-Pena, E. Vivaldo-Lima, J.F. Louvier-Hernandez, Y.V. Vorobiev and J. Gonzalez-Hernandez  
Physica Status Solidi (a)-Applications and Materials Science, Acc., 12/07

# APPENDIX 4

# Research Personnel

(SUPERVISOR)

NAME	CAT	DEPT	TD	JD	RD	XF	MG	NMc	A P	LS	JS	PS	CT	THESIS/PROJECT TOPIC	COMPL. DATE
A. Abdullah	2	ChE									X			Mathematical modelling, control and optimization of the synthesis of HDPE in a solution process	Sep 11
M. Achalpurkar	1	ChE				X								Gas separation membranes	Aug 10
S. Al-Adwani	2	ChE									X			Modelling of catalytic converters	Dec 12
M. Al-Saleh	2	ChE	X							X				Parameter estimation in polyolefinic systems using Monte Carlo Models	Aug 10
A. Al-Shaiban	1	ChE									X			Propylene polymerization with Ziegler-Natta catalysts	Apr 08
S. Aliakbari	2	Chem					X							Thermal interface materials for the microelectronics industry	Sep 08
T. Aridi	2	Chem					X							New grafting techniques	Dec 11
Y. Behjat	1	ChE							X					Stress-strain relationships with mol. weight of polymers (with M. Polak (Civ. Eng.))	May 09
S. Chen	2	Chem		X										Characterization of solutions of pyrene end-labelled poly(ethylene oxide) by fluorescence and Rheology	Sep 10
J. Cheng	2	ChE							X					Tensile properties of pipes (with M. Polak (Civ. Eng.))	Sep 08
Y. Choi	2	ChE									X			Synthesis of functional polyolefins	Sep 10
J. Dockendorff	2	Chem					X							Metal-loaded micelles as catalysts	Sep 08
M. Fowler	2	Chem		X										Characterization of the properties of polypeptide aggregates	Sep 11
M. Golbabaie	1	ChE								X				Characterization of natural fibers (with L. Erickson)	Dec 07
M. Haque	1	ChE						X	X					Water-soluble polymers	Dec.09
M. Ingratta	2	Chem		X										Synthesis and characterisation by fluorescence of polypeptides	May 09
N. Jacob	1	ChE			X									Non-linear predictive control of an emulsion polymerization reactor	Aug 09
W. Jung	1	ChE	X						X					Modeling and estimation for multicomponent polymerizations	Aug 08
S. Kim	1	ChE				X								Extraction of Sericin	May 08
P. Kruger	1	ChE								X				Polymer natural fiber composites	Dec 07
S. Kundu	2	ChE								X				Properties and degradation of polymers in hydrogen fuel cells (with M. Fowler)	Dec 08
M. Leung	1	ChE											X	Scheduling of a polymer compounding plant (with A. Elkamel)	Dec 08
T. Liu	1	ChE				X								Gas separation membranes	Aug 08
W.-Y. Lin	1	Chem					X							Arborescent copolymers as processing additives	Jun 08

**1 = MASc    2 = PhD    3 = Postdoctoral Fellow    4 = Res. Associate    5 = Technician**  
**TD=T.A.Duever    JD=J. Duhamel    RD=R. Dhib    XF=X. Feng    MG=M. Gauthier    NMc=N. McManus    AP=A. Penlidis    LS=L. Simon    JS=J.B.P. Soares**  
**PS=Pearl Sullivan    CT=C. Tzoganakis**

NAME	CAT	DEPT	TD	JD	RD	XF	MG	NMc	A P	LS	JS	PS	CT	THESIS/PROJECT TOPIC	COMPL. DATE
C. Madhuranthakam	4	ChE							X					Modelling/simulation/optimization of emulsion NBR/SBR systems	May 11
A. Maneshi	2	ChE								X	X			Synthesis and mathematical modelling of clay/polyolefin nanocomposites	Aug 08
S. Mehdiabadi	2	ChE									X			Synthesis and modelling of branched polyolefins with complex structures	Sep 09
M. Meysami	1	ChE											X	Devulcanization of tire rubber crumb with supercritical CO <sub>2</sub>	Sep 09
F. Moingeon	3	Chem					X							Branched polymers as processing additives for polyolefins	Feb 09
G. Moula	2	Chem		X										Characterization of solutions of pyrene labelled hydroxyethylcellulose by fluorescence and rheology	Sep 10
M.Mujiburohman	2	ChE				X								Aroma recovery from juices by membranes	Apr 08
A. Munam	3	Chem					X							Polyisobutylene ionomers	Feb 09
A. Nabifar	2	ChE						X	X					Multicomponent emulsion polymerization	Sep 11
O. Nguon	2	Chem					X							Polymer-stabilized nickel nanoparticle catalysts	Jun 10
V. Nooei	1	ChE	X										X	Compounding polymer blends in TSE	Apr 08
N. Omidbachsh	2 PT	ChE	X											Computer aided product design and development	Apr 09
E. Ortiz	2	ChE											X	Numerical simulations of reactive flows in twin-screw extruders	Apr 10
A. Rogalsky	1	ChE										X	X	Mechanical properties of PC/BBT blends	Sep 09
A. Saleh	1	ChE								X				Polymer wood fiber composites (with M. Sain)	Aug 07
M. Shaw	2	ChE	X											Fault detection in chemical processes	Aug 11
Y. Shen	4	Chem		X										Structure-property study of oil soluble dispersants	Sep 07
S.-Y. A. Shin	3	ChE								X	X			In-situ preparation of clay-thermoplastic nanocomposites	Aug 09
H. Siu	2	Chem		X										Fluorescence and rheological studies of surfactant-associative polymers associations	Sept 08
L. Sui	1	ChE											X	Rubber devulcanization and compounding	Dec 08
C. Sun	2	ChE				X								Development of PVDF membranes	Aug 09
H. Tareque	1	ChE											X	PC/PBT Compounding	Aug 09
Z. Ul-Islam	1	ChE			X									IR Drying of Polymer Solutions	Aug 08
I. Washington	1	ChE	X						X					Modeling and optimization of an NBR process	Aug 08
G. Whitton	2	Chem					X							Arborescent polymers form amino acids	Aug 11

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**TD=T.A.Duever    JD=J. Duhamel    RD=R. Dhib    XF=X. Feng    MG=M. Gauthier    NMc=N. McManus    AP=A. Penlidis    LS=L. Simon    JS=J.B.P. Soares**  
**PS=Pearl Sullivan    CT=C. Tzoganakis**

NAME	CAT	DEPT	TD	JD	RD	XF	MG	NMc	A P	LS	JS	PS	CT	THESIS/PROJECT TOPIC	COMPL. DATE
Z. Yao	1	ChE				X								Membranes for controlled release	Dec 09
M. Zhou	1	ChE						X	X					Unimolecular controlled radical polymerizations	Sep 09
S. Zhu	3	ChE											X	Reactive rubber modification	Apr 08

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