PPS-9

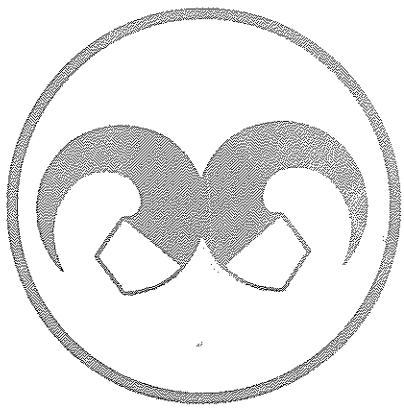
THE POLYMER PROCESSING SOCIETY

NINTH ANNUAL MEETING

Manchester, England

April 5-8, 1993

EXTENDED ABSTRACTS
&
FINAL PROGRAMME



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POLYMER PROCESSING SOCIETY

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The Polymer Processing Society

The PPS was founded in 1985 in Akron, USA. Since 1986 the annual meeting has been held in various places around the world: Montreal, Canada; Stuttgart, Germany; Orlando, USA; Kyoto, Japan; Nice, France; Hamilton, Canada; New Dehli, India. Latterly the meeting has cycled between Europe, the Americas and Asia. The 1994 Annual Meeting will take place in Akron, Ohio, USA during April. The 1995 Annual Meeting will take place in Seoul, Korea.

The goal of the PPS, as embodied in its constitution, is to foster scientific understanding and technical innovation in polymer processing by providing a discussion forum for the world-wide community of engineers and scientists in this field. The range of the PPS covers the reaction, formulation, processing and shaping operations needed to transform monomeric forms to commercial polymeric products.

In addition to the annual international conferences, the PPS activities include the arrangement of regional and local meetings, publication of the journal, *International Polymer Processing*, and sponsorship of educational seminars.

Membership of the PPS is open to all research workers in the field, and to all individuals who feel the activities of the society advance their professional development. The benefits for members consist of obtaining the PPS journal, *International Polymer Processing*, free and in the opportunity to attend the annual Meetings at reduced fees.

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PPS-9 Conference Committee

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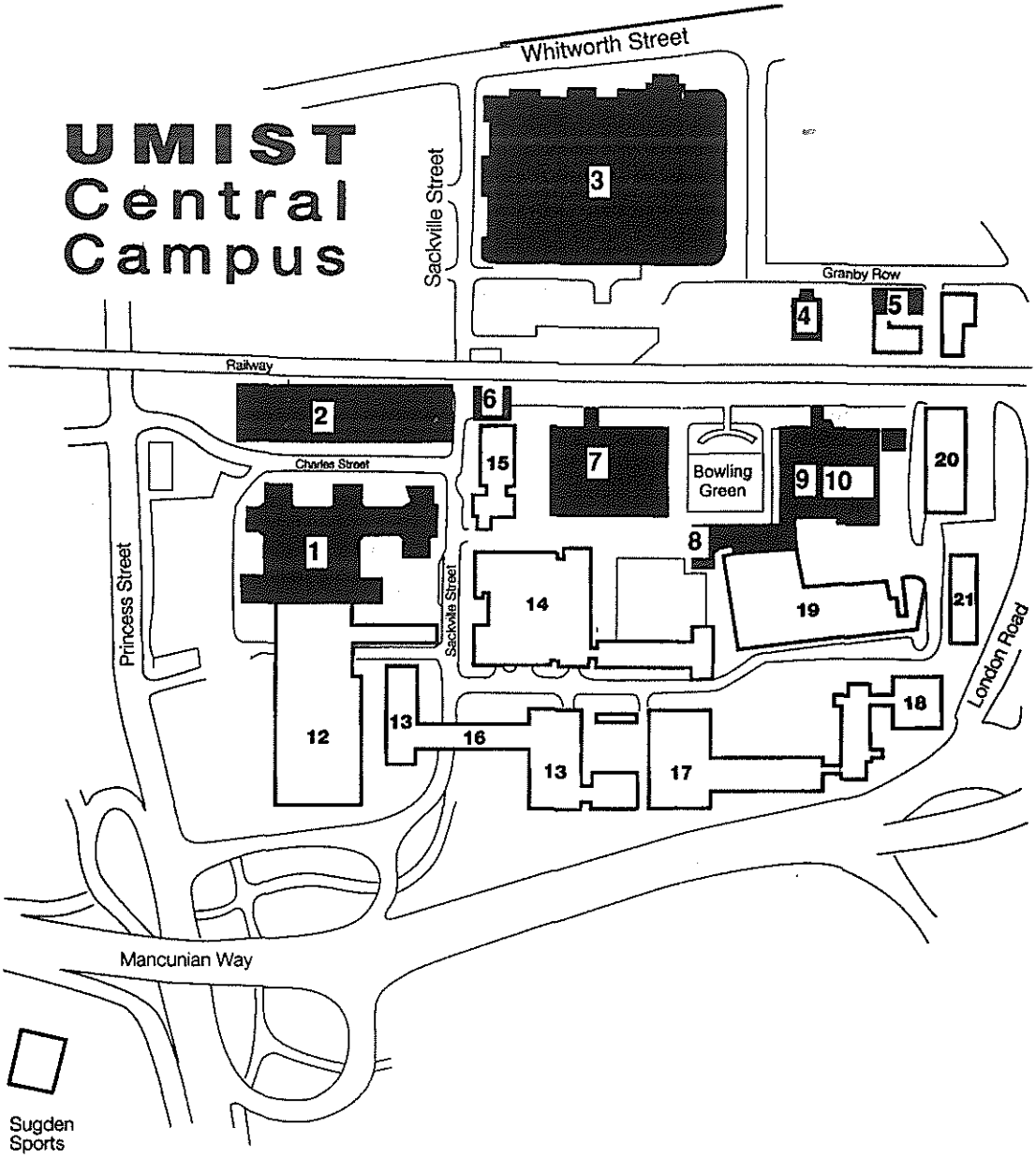
PREFACE

It has been a privilege to host the Ninth Annual Meeting of the Polymer Processing Society in Manchester in and around which are to be found the homes of some of the polymer industry's seminal achievments.

This volume contains the extended abstracts of nearly two hundred presented papers and another seventy poster papers representing together the leading edge in current developments from all over the world.

My thanks are due to all who have worked to make it possible, especially our Conference Secretary and Treasurer Dr. A J Ryan, the Technical Programme Coordinator Professor M J Bevis, my secretary Mrs. R Bradburn, our Conference Centre Manager Ms. K Spavin, the 31 symposium organisers, our sponsors, and of course all who attended and contributed papers and discussion.

S F Bush



KEY: CONFERENCE BUILDINGS

1. WESTON BUILDING
2. CAR PARK
3. MAIN BUILDING
4. CHANDOS HALL
5. NURSERY
6. SECURITY LODGE
7. RENOLD BUILDING (RB)
8. STAFF HOUSE
9. BARNES WALLIS
10. WRIGHT ROBINSON HALL

KEY: OTHER BUILDINGS

12. GEORGE BEGG
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16. CHEMISTRY LINK
17. FERRANTI
18. MATHS AND SOCIAL SCIENCE
19. CHEMICAL ENGINEERING
20. OPTOMETRY
21. PILOT PLANT

CONFERENCE AT A GLANCE

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April 4</td><td colspan="5">PPS Executive Meeting
09.00 - 18.00 Weston Building, Boardroom 1</td></tr>
<tr><td>Monday
April 5
pm</td><td colspan="5">16.00 - 1700 PPS BUSINESS MEETING in Renold Building C2
18.00 CONFERENCE OPENING CEREMONY in Renold Building C16
by Professor H C A Hankins, Principal of UMIST
followed by
PLENARY LECTURE by Professor I M Ward
"The development of properties in oriented polymers by tensile drawing, hydrostatic extrusion and die-drawing"
19.30 RECEPTION and BUFFET in the Barnes Wallis Building</td></tr>
<tr><td></td><td colspan="4">TECHNICAL PROGRAMME in the Renold Building</td><td>SocialProgramme</td></tr>
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<tr><td>Tues am</td><td>Symp 4</td><td>Symp 10</td><td>Symp. 11</td><td>Symp. 6</td><td>Granada Studios</td></tr>
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Symp.8</td><td>Symp 11</td><td>Symp 6</td><td></td></tr>
<tr><td colspan="4">POSTER SESSION - Symposia 4, 6, 8, 10, 11</td><td></td></tr>
<tr><td>Wed am</td><td>Symp 2</td><td>Symp 8</td><td>Symp 11
Symp 3</td><td>Symp 6
Symp 9</td><td rowspan="3">Chester Trip

19.30 Reception
20.00 Banquet</td></tr>
<tr><td>Wed pm</td><td>Symp 2</td><td>Symp 1</td><td>Symp 3</td><td>Symp 9</td></tr>
<tr><td colspan="4">POSTER SESSION Symposia 1, 2, 3, 5, 7, 9</td></tr>
<tr><td>Thurs am</td><td>Symp 2</td><td>Symp 1
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Tuesday Morning, April 6

	RBC2	RBE7
	4 - RHEOLOGY AND RHEOMETRY	**10 - FREE SURFACE MOULDING**
9.00	04-01 **MWD determination of ultra high MFR PP by melt rheology** Hee Ju Yoo	KN10-01 **Studies of blow molding, thermoforming and injection of polyethylene and talc filled polyethylene** J. L. White, C. Suh and S. Lim University of Akron, Ohio, USA.
9.20	04-02 **Viscoelastic flow properties and shear-heating of molten polymers in extremely high shear rate regions** K Iwakura, O Sugasawa and S Nosaka	
9.40	04-03 **Melt viscosity and elasticity of entagling polymers** Yongsok Seo	10-02 **Numerical simulation of the blow molding process** B Debbaut and B Hocq
10.00	04-04 **Rheological behaviour of semi-crystalline polymer during isothermal crystallization** C Carrot , J Guillet, K Boutahar	10-03 **Blow-moulding of hollow-walled containers** S F Bush and K R Large
10.20	coffee	coffee
10.40	04-05 **Testing rubber compounds with different commercial capillary rheometers** J L Leblanc	10-04 **Processing and modelling of the enhanced dimensional stability in heat-set PET containers** P Davidson and B Howarth
11.00	04-06 **In-line and on-line rheometry in extrusion and injection moulding processing** P D Coates, R K Chohan, D Groves, R G Speight, R M Rose and M Woodhead	10-05 **Viscoelastic simulation of PET stretch-blow molding** F M Schmidt, J F Agassant, M Bell, L Desoutter .
11.20	04-07 **Extrudate swell revisited:the influence of slip and non-isothermal conditions** E Mitsoulis and D G Kiriakidis	10-06 **The formation and removal of pin-holes from rotomoulded products** R J Crawford and A Spence
11.40	04-08 **A means of predicting interfacial instabilities in multilayer flows** W Michaeli and F Pohler	10-07 **Computer controlled rotational moulding of a hand prosthesis** S H Teoh, H Y Chew, N Muir
12.00	LUNCH	LUNCH

Tuesday Morning, April 6

	RBD7	RBC16
	11 -MATHEMATICAL METHODS AND CONTROL	**6 - COMPOSITES MANUFACTURING TECHNOLOGY**
9.00	KN11-01 **Review of mathematical models for polymer processing** C L Tucker III University of Illinois, USA	KN06-01 **Design of composite manufacturing processes** S F Bush UMIST, UK
9.40	11-02 **Systematic optimisation of single-screw plasticising units by means of the evolution strategy** H Potente and B Klarholz	06-02 **Spatially reinforced composite manufacture** S Addis, J Larkin, R McIlhagger
10.00	11-03 **Modelling of multilayer flows in coextrusion** A Torres, A Rincon, J Cabak, A N Hrymak and J Vlachopoulos	06-03 **Continuous fibre reinforced thermoplastic composites- A critical assessment of braiding as a technique for producing thin wall tubes suitable for post forming into complex three dimensional shapes** A C Angood & H Pentney
10.20	coffee	coffee
10.40	11-04 **CFD simulation of polymer flow problems using finite element methods** Y Khandhia	06-04 **Volumetric heating in the manufacture of thermosetting composites by pultrusion** J M Methven, S R Ghafariyan and A Z Abidin
11.00	11-05 **Finite element analysis of wirecoating co-extrusion** A A Mosquera , Y Khandia	06-05 **Impregnation process for glass rovings with a polyamide melt** R J Gaymans and H Bijsterbosch
11.20	11-06 **Die shape predictions for complex extrudates** J M Marchal	06-06 **A comparison of the unidirectional and radial in-plane flow of fluids through woven composite reinforcements** A J Salem R S Parnas
11.40	11-07 **Simulating flow with heat-transfer effects and multi-viscous polymer blends using the boundary element method** P J Gramann L Stradius and T A Osswald	06-07 **The location analysis and the selection criteria of polymer processings for thermoplastic composite systems** T Matsuo
12.00	LUNCH	LUNCH

	RBC2	RBE7
	4 - RHEOLOGY AND RHEOMETRY	**10 - FREE SURFACE MOULDING**
13.30	04-09 **Superimposed flow of filled polymer melts** T Kitano C Klason J Kubat	10-08 **Manufacture of photoelastic models by rotational moulding** L H Lee, I C Revie and J F Orr
13.50	04-10 **Rheology and rheometry for highly filled materials** G W M Peters, A B Spoelstra, H E H Meijer	10-09 **Developments in rotational moulding** G W Hunt
14.10	04-11 **Rheology of silicon-polypropylene ceramic compound** A I Isayev, X Fan	10-10 **Crosslinking of ethylene-vinylacetate and ethylene-methacrylate blends in rotomolding operations** I Epinasse, P Cassagnau and A Michel
14.30	04-12 **Viscosity characterization of fast curing thermoset molding compound using slit rheometer** S Han and K K Wan	10-11 **The uniaxial, constant width and sequential biaxial drawing ofpolyethylene terephthalate** D.H. Gordon, R.A. Duckett & I.M. Ward
14.50	tea	tea
		8 - REACTIVE PROCESSING
15.10	04-13 **Rheological behaviour of molten LDPE and LLDPE in shear and elongational flows** P Revenu, J Guillet and C Carrot	08-01 **Impingement mixing for reaction injection moulding** A Ho, R Yeo, A N Hrymak and P E Wood
15.30	04-14 **Multi axial rheological system (MARS II): measurement of elongational viscosity based on lubricated squeezing flow** I R Harrison and Ti-Chung Hsu	08-02 **Morphology studies of reaction injection moulded segmented polyamides** A F Johnson and S-W Tsui S Friebel and R Harris
15.50	04-15 **Determination of extensional viscosity from capillary rheometer entrance pressure drop measurements** A R Davies, I M Farah, M Rides and K Thomas	08-03 **Mechanical properties of organic fibre reinforced composites manufactured using structural reaction injection moulding** S D Long, A F Johnson and P D Coates
16.10	04-16 **Converging flow measurements for injection moulding** D Groves, R K Chohan and P D Coates	08-04 **New small cell polyurethane rigid insulation foams** J Thoen, H Grünbauer and G Smits
16.30	04-17 **The processing of molten polymers** R Ahmed and M R Mackley	08-05 **In-shot ratio variation in reaction injection moulding (RIM)** P D Coates, A F Johnson, N Tucker, S S F Wong
16.50	04-18 **On the use of speckle photography in rheological measurements of polymer systems** Y Ivanov ,V Kavardjikov , V Shapiro	08-06 **Fast-curing epoxy matrices for structural RIM** S Mortimer, A J Ryan and J L Stanford
17.10 - 17.30	04-19 **Pulsating slip-stick flow of a second order viscoelastic liquid inside a circular die** J David, P Filip, O Bartos	08-07 **Degradation kinetic modelling for process control of viscosity in the reactive extrusion of polypropylene** A Pabedinskas, S T Balke and W R Cluett

	RBD7	RBC16
	11 - MATHEMATICAL METHODS AND CONTROL	**6 - COMPOSITES MANUFACTURING TECHNOLOGY**
13.30	11-08 **Fully transient analysis of heat transfer in single and twin screw mixing elements** A Kiani, Paul G Anderson, ,E W Grald S Subbiah	06-08 **A model for the consolidation process in thermoplastic matrix composites manufactured by powder impregnation** S Toll, M Conner, J A Manson, A G Gibson
13.50	11-09 **Finite development modelling of the leakage flow across the flights of a plasticating extruder** V Nassehi and R Salemi	06-09 **Void formation and elimination during the processing of thermoplastic matrix composites** Y Leterrier, C G'Sell
14.10	11-10 **Computation of inertia effects in injection moulding** B Magnin, T Coupez, M Vincent and J F Agassant	06-10 **Process optimisation in screw plasticating of discontinuous fibre filled thermoplastics** H J Wolf
14.30	11-11 **Numerical simulation of the injection moulding process: calculation of density and thermal stresses** L W Caspers	06-11 **Dielectric monitoring of cure in a commercial epoxy matrix resin** G M Maistros, I K Partridge , J M Barton
14.50	tea	tea
15.10	11-12 **Numerical simulation of the multilayer injection moulding process** W F Zoetelief	06-12 **The continuous curing process for thick composite structures** H Teng, C Kim C L Tucker III and S R White
15.30	11-13 **Numerical analysis of startup contraction flows using multi-mode differential constitutive models** F P T Baaijens	06-13 **Dielectric analysis of the cure of a thermosetting novolac/ hexamethylene-tetramine system** C Holland, W Stark and W Mielke
15.50	11-14 **On the modelling of postfilling stages in the injection molding process** G Titomanlio, V Brucato, M Saiu .	06-14 **Factors affecting fibre-matrix contacting in fibre filled granules** D R Blackburn and O K Ademosu
16.10	11-15 **Modelling of the resin transfer moulding process** L F A Douven	06-15 **Numerical simulation of fiber orientation in injection moulding of short-fiber-reinforced thermoplastics** Seong Taek Chung and Tai Hun Kwon
16.30	11-16 **Prediction of thermally-induced residual stresses within a molded amorphous thermoplastic** J X Rietveld R K Mohammed and S-J Liu	06-16 **Evaluating the confocal laser scanning microscope technique for true 3D fibre orientation measurements in composites** A R Clarke and G Archenhold
16.50	11-17 **Numerical simulation of free-surface problem in viscoelastic flow** T Sato and S M Richardson	06-17 **Calculation of short fibre orientation in axisymmetric mold filling** E Devilers and M Vincent
17.10 - 17.30	11-18 **Sheet-die design including multi-die body thermal interactions** J F T Pittman and R Sander	

PIC Executive Mtg

4 - Rheology and Rheometry

6 - Composites Manufacturing Technology

8 - Reactive Processing

10 - Free Surface Moulding

11 - Mathematical Methods and Control

	RBC2	RBE7
	2 - INJECTION MOULDING	**8 - REACTIVE PROCESSING**
9.00	KN02-01 **Recent developments and future trends in moulding technology** H Takahashi Toyota Central Research & Development Laboratories Inc, Japan	08-08 **The effect of processing parameters on PBT/epoxy reactive compounding** K-J Min, M-H Lee and E-S Lee
9.20		08-09 **Simulation of reactive extrusion in close intermeshing corotating twin screw extruders** W Michaeli and A Grefenstein
9.40	02-02 **Measurement of melt temperature profiles in injection moulding** A K Wood and M Yue	08-10 **Novel residence time distribution and in line rheometry measurements in reactive extrusion** A F Johnson, H G Edwards, N Ward, P D Coates, D J Fleming
10.00	02-03 **Measured and predicted polymer melt temperatures for an IR pyrometer viewing a linear temperature gradient** J X Rietveld and G-Y Lai	08-11 **Characterisation of Polyamide 6 synthesised in a twin-screw extruder** P R Hornsby, J F Tung and K Tarverdi
10.20	coffee	coffee
10.40	02-04 **Ultrasonic techniques to monitor processing conditions** C L Thomas, A Tseng, J L Rose, A J Bur	08-12 **Free radical degradation of polypropylene** V Triacca, P Wong and A N Hrymak WITHDRAWN / REPLACED 08-20
11.00	02-05 **The use of process measurements for real time injection moulding process control** R G Speight, P D Coates and A J Day	08-13 **Modelling and simulation of high Reynolds' number flows during reaction injection mold filling** T J Spiegelhoff and T A Osswald
11.20	02-06 **Transient melt behaviour of a rubber-modified, polycarbonate / poly-butylene terephthalate blend during injection molding** L R Schmidt, J L Maxam	08-14 **Melt grafting of basic monomers onto polyolefins in a twin-screw extruder** K E Oliphant and W E Baker
11.40	02-07 **The effect of the non-return valve design on the performance of reciprocating screws** M F Martin, M A Spalding, J A Myers, M Maurer and M Majick	08-15 **Rheokinetics of cyclic carbonate oligomer polymerization** A J Salem, B J McKinley and M L Todt
12.00	LUNCH	LUNCH

	RBD7	RBC16
	11 -MATHEMATICAL METHODS AND CONTROL	**6 - COMPOSITES MANUFACTURING TECHNOLOGY**
9.00	11-19 **Finite element analysis of polymer melt flow in sheet extrusion dies** S Fang and H G Fritz	06-18 **Analysis of the residual material state in wet filament wound thick walled pipes** S Kurt Olofsson
9.20	11-20 **Permeability measurement and dispersion effects in resin transfer molding** R Dessenberger, K F Heitzmann, C L Tucker III	06-19 **Impact performance and failure mechanisms in continuous fibre reinforced composites** M J Folkes, I Grant, H Jahankhani and K A Hodd
9.40	11-21 **3-D non-isothermal flow simulation of non-Newtonian fluids with viscous heating** Yeh Wang	06-20 **Processing and properties of structural composites formed by reaction injection moulding (SRIM)** A J Ryan, J L Stanford and X Tao
10.00	11-22 **A finite element method for multi-material injection** Fortin Andre, Y Demay WITHDRAWN	06-21 **Injection molding behaviour of a cellulose fiber polypropylene composite** J X Rietveld and Z-Q Hua
10.20	coffee	coffee
	3 - FIBRES AND FILMS	
10.40	KN03-01 **Application of viscoplastic elastic model to the film blowing of polyethylene blends** A K Babel and G A Campbell Clarkson University, Potsdam, USA.	06-22 **Residual stress and shrinkage in carbon fiber reinforced plastics** D S Kim, J Y Kwang, D J Lyou and S C Kim
11.00		06 -23 **Interface phase model for ultra-tough polyolefine/filler composites** X Zhu, C Liu and Z Qi
		9 - ALLOYS AND BLENDS
11.20	03-02 **Structure development in solution spinning of nylon 6** M Ito, Y Morishita, T Kanamoto	KN09-01 **Rheology of polymer blends** Leszek Ultracki Industrial Materials Institute, Canada.
11.40	03-03 **Effect of liquid isothermal bath on fibre structure development in high-speed melt spinning of poly(ethylene terephthalate)** T Kikutani, M Sato, A Takaku and N Okui	
12.00	LUNCH	LUNCH

	RBC2	RBE7
	2 - INJECTION MOULDING	**1 - EXTRUSION**
13.30	02-08 **Plastic injection molding by using special mold made up of flexible wall** A.Cui, M Konno, N Nichiwaki, S Hori and M Inoue	KN01-01 **SCOREX - a process for the management of morphology and product geometry in thermoplastic profile extrusions.** P S Allan, M J Bevis, P Chuah and I Pinwill Brunel University, Uxbridge, West London, UK.
13.50	02-09 **Shear Controlled Orientation in Injection Moulding (SCORIM) for the control of microstructure in moulded thermotropic liquid crystal polymers** L Wang, P Chuah, P S Allan and M J Bevis	
14.10	02-10 **Orientation in individual strata of multilayer microstructure resulted from injection moulding of thermotropic polymers** E Suokas	01-02 **A network approach for profile die design** M A Huneault, P G Lafleur and P J Carreau
14.30	02-11 **Control of thermal expansion behaviour of an ethylene-propylene block-copolymer blend using multi live-feed moulding** M Nakamaru	01-03 **Melt flow in extruders** N Dontula and G A Campbell
14.50	02-12 **The effect of fibre degradation on the properties of recycled polycarbonate** C A Bernardo, M J Oliveira and A M Cunha	01-04 **Rear vent devolatilization of acrylic polymer solutions in a non-intermeshing counter-rotating twin screw extruder** M A Garcia
15.10	tea	tea
15.30	02-13 **Verification of injection mold filling software: some surprising pitfalls** Gibson Batch	01-05 **Residence time distribution of a twin screw extruder** J P Puaux and A Ainser
15.50	02-14 **Expert system to rectify injection moulding defects** Mladen Sercer, Mladen Slavica, Igor Catic	01-06 **Measurement of local process variables in twin screw extruders: melt temperature, filling degree, residence tine and energy input** P Hone and H G Fritz
16.10	02-15 **Computer simulation of the injection moulding cycle: current status and future trends** M D H Thomas	01-07 **The analysis of mixing using a numerical flow model of the NITSE nip** J H Conner and D I Bigio
16.30		01-08 **Basic studies of peroxide induced reactions on thermoplastics in twin screw extruders** J L White, B J Kim and K Ebner
16.50		01-09 **Providing backmixing in an extruder** Y Lu, J A Biesenberger and D Todd
17.10 - 17.30		01-10 **Radiotracers in extrusion process investigation** A Zauner and M Stephan

	RBD7	RBC16
	3 - FIBRES AND FILMS	**9 - ALLOYS AND BLENDS**
13.30	03-04 **Structure-property-processing relationships in blown film: modulus in long duration balloon films** I R Harrison and D M Simpson	09-02 **Chemistry in blends of nylons with maleic anhydride containing polymers** M van Duin, R J M Borggreve and M P T Aussenms
13.50	03-05 **Crystallization kinetics during hot-drawing of poly(ethylene terephthalate) film: influence of temperature and molecular weight on strain-rate/draw-time superposition** D R Salem	09-03 **The effect of a polystyrene-hydrolyzed poly(t-butyl acryate) diblock copolymer on the properties of poly (2,6-dimethyl-1,4-phenylene ether) [PPE] and polyamide-6[PA] blends** W H Jo and H C Kim
14.10	03-06 **Drawing of poly(ethylene terephthalate) film under biaxial stress: an experimental study and assessment of the hybrid glass/rubber constitutive model** C P Buckley and D C Jones and D P Jones	09-04 **Flow behaviour of interface structure controlled PP/PA alloys** Taichi Nishio, K Higashi, S Sanada, T Ogihara
14.30	03-07 **Numerical simulation of the film blowing process: material characterisation** P P Tas, J H Palmen, and J M Steuten	09-05 **Fracture behaviour of a nylon-polyphenylene ether blend (ultranyl)** L. Parisi, A Marchetti, A Lazzeri and G Levita.
14.50	03-08 **Stability of tubular film flowing process** B M Kim and J C Hyun	09-06 **Blends of polyamide 6 with γ-irradiated polyolefins** G Spadaro, A Valenza, D Aceimo, E Calderaro
15.10	tea	tea
15.30	03-09 **Infra-red heating of plastic tubes (application to BOPP films)** H Benkreira, N Benson P Haydock and R Patel	09-07 **A study on the morphology of PE/PA6 blend** X Chen and Y Lu
15.50	03-10 **Film blowing and related drawing poolymer operations** T Papanastasiou	09-08 **Control of the morphology of a blend by crosslinking of a dispersed elastomeric phase in a polypropylene matrix** A De Loor, P Cassagnau, A Michel, B Vergne
16.10	03-11 **The spinnability and dyeability of PP/CDPET blend fibers** B Liang and L Pan WITHDRAWN	09-09 **Structure property relationships in a reactively coupled ductile matrix/brittle dispersed phase blend** T M Liu, H Q Xie, W E Baker, K J O'Callaghan, A Rudin
16.30	03-12 **The elements of fracture mechanics in the prediction of polymer strength** Jozef Kuczmaszewki	09-10 **Structure and properties of PP/CDPET blends** L Pan and B Liang
16.50	03-13 **Molecular behaviour of PET chains during flat film processing** P Lapersonne, J B Faisant de Champchesnel, J F Tassin, G. Lorentz, L Monnerie, D I Bower and I M Ward	09-11 **Reactive blending of PET and ethylene-glycidyl methacrylate copolymers** M K Akkapeddi and B van Buskirk
17.10 - 17.30		09-12 **Morphology control of polyester/polyolefin blends by interfacial ester exchange reactions** A Legros, P J Carreau, B D Favis, A Michel

POSTER PAPERS - Wednesday

1 - Extrusion Processes

2 - Injection Moulding

3 - Fibres and Films

5 - Mixing and Compounding

7 - Structure Development in Processing

9 - Alloys and Blends

	RBC2	RBE7
	2 - INJECTION MOULDING	**1 - EXTRUSION**
9.00	02-16 **Comparison of analogue and computer simulated steady-state heat transfer in the injection moulds** Peros Raos, Igor Catic, Zlatko Sirac	01-11 **Statistical process control studies for single and twin screw extrusion** P D Coates, R M Rose, M Woodhead, S Al Jamal and X Ma
9.20	02-17 **Shear Heating Effects in Injection Moulding** M Yue and A K Wood	01-12 **The art and science of design of screw configurations for co-rotating intermeshing twin screw extruders** K S Shen
		5 - MIXING AND COMPOUNDING
9.40	02-18 **Local orthotropic skinkage prediction on injection moulded polymer plates** G Regnier and J P Trotignon	05-01 **Flow visualisation and modelling of rubber mixing** J Butler, P K Freakley, S N Ghafouri and V Nassehi
10.00	02-19 **Shrinkage-in and out of the mould** J B Smith	05-02 **Flow in a Cooke intermeshing rotor internal mixer** P S Kim and J L White
10.20	coffee	coffee
10.40	02-20 **Generation mechanism of residual stress in polypropylene under injection moulding** Y Miyano & H Shimoda ,M Yamabe & M Ishijima	05-03 **The influence of centre line ratio on performance of co-rotating twin screw extruders** J D Lea
11.00	02-21 **Development of the warpage analysis system for injection moulding** Takahiro Ueno and M Ishiwa	05-04 **Morphological changes of a polymer blend in a corotative twin-screw extruder** L Delamare and B Vergnes
11.20	02-22 **Dynamic visual analysis of fiber orientation process by glass-inserted mold** H Yokoi , Y Murata and Y Nishi	05-05 **Basic studies of flow and blending in modular intermeshing counter-rotating twin screw extruders** J L White, S H Lim and A O Adewale
11.40	02-23 **Measuring the fibre orientation & elastic properties of injection moulded long glass fibre reinforced nylon.** P J Hine, N Davidson, R A Duckett and I M Ward	05-06 **Polymer blending using a cavity transfer mixer with separate polymer feeds: a flexible compounding process** G M Gale and R S Hindmarch
12.00	LUNCH	LUNCH

	RBD7	RBC16
	7 - STRUCTURE DEVELOPMENT	**9 - ALLOYS AND BLENDS**
9.00	KN07-01 **Unravelling the mechanism of shear induced crystallization in polypropylene** H Janeschitz-Kriegl, S Liedauer, P Jerschow, G Eder (Linz University) W Geymayer and E Ingolic (Graz University) Austria.	09-13 **Compatibility and morphology studies of PPO multi-component blends** B Liang and L Pan
9.20		09-14 **Transesterification of PC/PET blends** W Zheng, Z Wan and Z Qi
9.40	07-02 **Crystallization of polyamide 66 under flow conditions** C Magnet, N Billon, J M Haudin	09-15 **Modification of the interfacial region in immiscible polymer blends by a physical means.** A Leclair and B D Favis
10.00	07-03 **Flow induced textures in multiphase polymers** M J Folkes, M J Holloway and S C Steadman	09-16 **Thermoplastic polyimide/liquid crystalline polymer alloy** A Morita, K Ito, H Oochi, T Takahashi, T Tsutsumi and T Ueki
10.20	coffee	coffee
10.40	07-04 **Dynamic viscoelastic properties of PET/PBT blend films** K Nakayama, S I Kim and A Kaito	09-17 **The macromolecule structure of poly(caprolactone)-poly(ethylene glycol) block copolymer** L Gu, F Chen and Y Chen No show Replace 07-25
11.00	07-05 **Influence of the thermomechanical parameters on the morphology of polyamide polypropylene blend** B Knobel, J P Villemaire and J F Agassant	KN09-18 **Mechanical properties of polymer blends** C B Bucknall Cranfield Institute of Technology.
11.20	07-06 **Morphology development in a twin-screw extruder** Z H Shi and L A Utracki	
11.40	07-07 **Solid-state deformation of poly-propylene/poly(butene-1) blends** N Fujii, W Wang, H Uehara and T Kanamoto	09-19 **Study of impact behaviour of polymer alloys with the use of optical sensors and digital image analysis** T Hayashi, T Nishi, T Miyamoto and S Sonobe
12.00	LUNCH	LUNCH

meet John Stafford

Thursday Afternoon, April 8

	RBC2	RBE7
	2 - INJECTION MOULDING	**5 - MIXING AND COMPOUNDING**
13.30	02-24 **Flexural behaviour of injection moulded polypropylene plates** A M Cunha and A S Pouzada	05-07 **An experimental and theoretical study of the maddock dispersive mixer in plasticating extrusion** I Postoaca and C Klason cancelled
13.50	02-25 **Design and development of short glass fibre reinforced nylon 66 handle bar assembly for a bicycle** A Gupta, A Misra, R K Mittal and P N Rao CANCEL	05-08 **Dispersive mixing of immiscible liquids** J H H Janssen, H E H Meijer, G W M Peters
14.10		05-09 **Dispersive mixing of elastomeric modifiers in a polymeric matrix** P R Soskey, R P Neu, H H Chin, S Tuinstra & K A Stromsland
14.30		05-10 **Studies of titanium dioxide agglomerate dispersion in high viscosity media** Y-J Lee, I Manas-Zloczower & D L Feke
14.50	tea	tea
15.10		05-11 **Masterbatch formulation for use in single screw machines** H Benkheira, R Britton
15.30		05-12 **A study of conductive mechanism of carbon black composites by rheological properties** K Uesugi, H Suzuki, K Sakata,T Amari
15.50		05-13 **Processing and fracture behaviour of thermoplastics modified by coated fillers** F Bellahdeb, C L Birchenough, J F Harper, B Haworth
16.10		05-14 **Monitoring the characteristics of calcium carbonate filled polypropylene** R Gendron, M.M. Dumoulin and J Tatibouet

	RBD7	RBC16
	7 - STRUCTURE DEVELOPMENT	**9 - ALLOYS AND BLENDS**
13.30	07-08 **The rheological behaviour and mechanical properties of mechanochemically degraded PVC** Shaoyun Guo and Xi Xu	09-20 **The importance of thermal blunting in the toughening process of PA-rubber blends** K Dijkstra and R J Gaymans
13.50	07-09 **The morphology and structure of PVC upon processing and reprocessing** J A Covas	09-21 **Effect of rubber molecular weight on brittle-ductile transition in PVC/NBR blends** Z Liu, Z Qi and F Wang
14.10	07-10 **Biaxial orientation of PVC compounds** M Gilbert and D J Hitt	09-22 **Thermoplastics toughened polyphenylene sulfide - impact property** K Mai, M Zhang, H Zeng and S Qi
14.30	07-11 **Morphology and mechanical behaviour of moulded-in hinges** I Naundorf, S Deininger, S Osterloh and P Eyerer	09-23 **Phase separation in blends of epoxy resin and poly (2,6-dimethyl-1.4 phenylene ether)** R W Venderbosch, K Kawanishi, J Bussink, H E H Meijer and P J Lemstra
14.50	tea	tea
15.10	07-12 **The morphology and failure behaviour of polypropylene and polyethylene butt-welds** M J Oliveira, C A Bernardo, D A Hemsley	09-24 **EVA/PMMA-blends and IPN's** U Schulze and M Rätzsch
15.30	07-13 **Nucleation control in polymer compounds** S P Fairgrieve	09-25 **Structure and characterisation of crosslinked epoxy resin modified with polycarbonate (PC) - (i) reaction of PC with difunctional epoxy resin (EP)** Rhong Minzhi and Zeng Hanmin
15.50	07-14 **The role of the matrix in the welding of thermoplastic based composites** J M Kenny	09-26 **Carbon black filled polymer blends** G Hauf
16.10	07-15 **Morphology of poly (ethylene terephthalate) fibres and films as revealed by chemical etching** V B Gupta, S K Sett and J Radhakrishnan	09-27 **Rheological and morphological studies on short glass fibre reinforced composites based on polyamide 6 and ABS blend matrices** K Kannan and A Misra