INSTITUTE FOR POLYMER RESEARCH (IPR)
UNIVERSITY OF WATERLOO
WATERLOO, ONTARIO N2L 3G1

NEWSLETTER 2018

1. NOTE FROM PROFESSOR JEAN DUHAMEL, IPR DIRECTOR

The past year was an important milestone in the existence of the Institute for Polymer Research (IPR) as it marked its 40th anniversary. Founded in 1978 by Profs. O'Driscoll from the Chemical Engineering Department and Rudin from the Department of Chemistry, its mandate was mainly to nurture interactions between researchers in Polymer Science and Engineering coming from the Industry and the academic community of the University of Waterloo. The vision instilled into the creation of the IPR by its two founders retained its significance to this day as illustrated by our uninterrupted series of 40 annual symposia given typically in May which have been attended by numerous colleagues from both industry and academia. Celebration was in order for such an achievement and the 40th IPR Symposium, which was held on May 9th, 2018, was a true Polymer Feast featuring Distinguished 2018 IPR Lecturer, Prof. Marc Hillmyer from the University of Minnesota, who gave an energizing lecture entitled "Nanoporous Materials Employing Disordered Block Polymers as Key Ingredients" on the following day (May 10th).

The 2018 IPR Symposium was also packed with no less than 23 oral presentations given by our graduate students, a clear testimony of the vitality of the IPR. Our two IPR Awardees were Alison Scott from the group of Prof. Penlidis and Remi Casier from my group. Beside their excellent research output, Alison and Remi have always been committed IPR citizens as demonstrated by their involvement in all IPR activities. Their presentation provided a clear insight on polymeric materials for sensors and the dynamics of polypeptides. Our two industrial speakers, Drs. Joel Goldstein from OMNOVA and David Campbell from BASF, gave the two keynote lectures at the 2018 IPR Symposium on release coatings and high temperature polymerization, respectively. Besides our distinguished guests from OMNOVA and BASF, industry visitors from Arlanxeo, EcoSynthetix, Princeton Polymer Consulting, Ontario Centers of Excellence, and Polyanalytik also attended the symposium. The oral presentations were followed by a 1 hr-long poster session given by 12 student presenters. The symposium wrapped up at the University Club where all student, faculty, and industry attendees congregated for a nice dinner which was followed by speeches on the IPR by the previous IPR Director, Prof. Penlidis, who reminisced on the earlier years of the institute, and myself, who gave a summary of the more recent past of the IPR.

What distinguished the 2018 IPR Symposium from earlier symposia was its energy. The excitement associated with the 40th iteration of the annual symposium, the gathering of all participants for the dinner, and the Distinguished IPR Lecture all contributed to this special atmosphere. Considering the energy generated by the 2018 symposium, efforts will be made to continue with its new features that were introduced for the first time on this occasion, such as the Distinguished IPR Lecture while still ensuring that the budget for the symposium remains balanced! As in the past, the symposium provided an ideal venue for industry and academic attendees to mingle, exchange ideas, and discuss possible collaborations.

Among the highlights of this year, the IPR started a series of IPR student presentations that provided information on the main techniques mastered by senior graduate students during the course of their program. Topics such as dynamic light scattering, gel permeation chromatography, elemental analysis, fluorescence, and many others were introduced by nine graduate students so far. In terms of achievements by faculties, Prof. Mario Gauthier continues to represent the IPR on the international stage as recipient of the High-end Foreign Experts Program Award with Wuhan in the Hubei Province (China).

The IPR is also delighted to congratulate Prof. Tzoganakis on receiving two international awards in 2018, namely the James L. White Innovation Award of the Polymer Processing Society and the Heinz Hermann Award from the

Extrusion Division of the Society of Plastics Engineers. Both awards are in recognition of the outstanding contributions in reactive extrusion (REX) made by Prof. Tzoganakis to the devulcanization of rubber which is being applied to regenerate the rubber of tyres under a form that can be processed anew. We certainly wish him on-going success with this terrific technology!

IPR professors were also quite busy with numerous editorial duties during 2018. Profs. Penlidis and Vivaldo Lima both served on the editorial board of J. Macromol. Sci.- Pure Appl. Chem. and Prof. Penlidis on the editorial board of Appl. Chem. Polymer-Plastics Techn. and Eng., Macromol. React. Eng., and Processes. Prof Penlidis acted as guest-editor in 2017/2018 of a special issue on water-soluble polymers; 17 contributions; this became a book in 2018 Profs. Zhao and Duhamel served as Guest Editor of a special issue on Surface modification and functional coating for polymers in MDPI Polymers and Polymer Characterization in Polymers, respectively. Prof. Jean Duhamel has become a member of the Editorial Advisory Board of Langmuir.

Prof. Penlidis organized and delivered a 2-day industrial intensive short course on polymerization/polymer characterization/ processes (the 35th North American Course) on June 4-5, 2018 at Mondelez International, East Hanover, NJ, USA (75 participants). Prof. Zhao co-organized a symposium entitled “Advanced Functional Materials Track” at the 68th Canadian Chemical Engineering Conference, Toronto, in Oct 2018 and another entitled “Physical Properties and Design of Bioadhesives” the 6th World Congress on Adhesion and Related Phenomena in conjunction with the 41th annual meeting of the adhesion society in San Diego on Feb 25-March 1, 2018. Prof. Duhamel organized a symposium entitled “Polysaccharides: Characterization and Modification” at the CSC in Edmonton (May 2018).

Looking forward, the two main events of 2019 will be the Distinguished IPR Lecture held on February 5th, 2019 and the 41st IPR Symposium which will take place on May 8th, 2019. Unfortunately, it was not possible to combine the 2019 Distinguished IPR Lecture with the IPR Symposium this year. The Distinguished IPR Lecture will be delivered by Prof. Mitchell A. Winnik from the University of Toronto. We are most excited to host Mitch as he is a most accomplished world-renown Polymer Scientist. The symposium in May will feature two keynote lectures, one by Mr. Brandon Konrad from Lorama (Mississauga) and the other by Dr. Anna Mathew from Dupont (Kingston).

In summary, 2018 has been an eventful year as the IPR marked its 40th anniversary, but 2019 promises to be as exciting. We certainly look forward to seeing you attend the numerous activities to be offered by the institute during 2019.

2. ANNUAL IPR SYMPOSIUM

The 41st Annual IPR Symposium will be held May 8, 2019. A schedule and registration forms will be circulated electronically.

Many thanks to all who participated in the 2018 Symposium (an audience of about 90 people). IPR received very positive feedback regarding the topics covered. The 2018 program and the list of industrial participants 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 2018, the IPR office sent out 35 preprints to our members (Appendix 3).

5. RESEARCH PROGRAMS

We have more than 90 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 email/call the appropriate supervisor or the IPR office at <ipr@uwaterloo.ca>, 519/888-4789.

6. RECENTLY GRADUATED STUDENTS

J. Duhamel

MSc	Chem	Zhang, Q.	Thermoresponsive Starch Nanoparticles for Use in the Extraction of Oil from Oil Sands
MSc	Chem	Patel, S.	Effect of Linker Length between Pyrene and PBMA to Detection of Nitroaromatic Compounds through Fluorescence Quenching of Pyrene Labelled Starch Nanoparticles

X. Feng

MASc	ChE	Wang, X.	Removal of bromophenols from wastewater by sorption
PhD	ChE	Zhang, B.	Recovery of dairy aroma compounds and concentration of dairy solutions by membranes
MASc	ChE	Wang, Y.	Extraction and concentration of glutathione from yeast

Y. Li

MASc	ChE	Meng, H.	Polymers for organic solar cells
MASc	ChE	Zhu, J.	Polymer based chemical sensors

A. Penlidis

PhD	ChE	Al-Ghamdi, M.	Effect of Linker Length between Pyrene and PBMA to Detection of Nitroaromatic Compounds through Fluorescence Quenching of Pyrene Labelled Starch Nanoparticles

D. Schipper

Msc	Chem	Claridge, R.	New Synthetic Approach to Thiazole-Based Conjugated Polymers and Their Modification

M. Tam

MASc	ChE	Wei, S.	Improving paper strength using cellulose nanofibrils and starch nanoparticles

E. Vivaldo-Lima

M.Eng	Meng	Miguel Ángel Vega-Hernández,	Development of polystyrene composites based on blue agave bagasse by in situ RAFT polymerization

X. Wang

PhD	Chem	Lanigan N.	Bulk supramolecular polymers of metal carbonyl derivatives
PhD	Chem	Zhang, Z.	Synthesis and characterization of polymer grafted cellulose nanocrystals
PhD	Chem	Liu, D.	Self-assembly of metal carbonyl polymers and small molecules

B. Zhao

MASc	ChE	Zhang, C.	Evaluation of Bio/pMDI Wood Adhesives
MASc	ChE	Vandenberg, J.	Additive Manufacturing of High Temperature Strain Gauges

7. ACADEMIC MEMBERS OF THE INSTITUTE FOR POLYMER RESEARCH

Professors:

R. Dhib	Chem. Eng.	Ryerson
T.A. Duever	Chem. Eng.	Ryerson
J. Duhamel, Director	Chemistry	Waterloo
X. Feng	Chem. Eng.	Waterloo
J. Forrest	Phys. Astro.	Waterloo
M. Gauthier	Chemistry	Waterloo
Y. Li	Chem. Eng.	Waterloo
N. McManus	Chem. Eng.	Waterloo
A. Penlidis	Chem. Eng.	Waterloo
D. Schipper	Chemistry	Waterloo
L.C. Simon	Chem. Eng.	Waterloo
M. Tam	Chem. Eng.	Waterloo
C. Tzoganakis	Chem. Eng.	Waterloo
E. Vivaldo-Lima	Chem. Eng.	UNAM, Mexico
X. Wang	Chemistry	Waterloo
B. Zhao	Chem. Eng.	Waterloo

For a brief description of research interests and projects, along with contact information, please visit the following web link: www.uwaterloo.ca/institute-polymer-research/

8. MEMBER COMPANIES—2018

Currently we have **6 member companies**: (refer also Appendix 3)
BASF
Compuplast Canada Inc.
Lanxess Inc.
OMNOVA Solutions Inc.
PolyVation, The Netherlands
Princeton Polymer Consultants, USA

9. STUDENT AWARDS

J. Duhamel

PhD student Remi Casier obtained the IPR Award and is the recipient of an OGS fellowship.
PhD student Janine Thoma is the recipient of a Nano fellowship from WIN.

A. Penlidis

Alison Scott, was awarded a 3-yr NSERC Alexander Graham Bell Canada Graduate Scholarship (CGS D) and received the IPR Award, 2018

10. FACULTY AWARDS

E. Vivaldo Lima

Prof. Vivaldo-Lima received one of Publons Top Reviewers for Chemistry Awards (top 1% of reviewers in Chemistry), September 2018.

C. Tzoganakis

James L. White Innovation Award, Polymer Processing Society (2018) to honor outstanding researcher(s) or inventor(s) from both academia and industry, either as individuals or as a group, in the area of polymer processing and related fields. The award is for an innovative development in the field of polymer processing technologies with recent commercial impact. It aims to recognize originality, innovation and creativity among researcher(s) or inventor(s) in the science and technology of processing polymers and polymeric products.
https://psfebus.allenpress.com/eBusPOPR/AWARDS/JamesLWhiteAward/CostasTzoganakis.aspx

Heinz Hermann Award, Extrusion Division, Society of Plastics Engineers (2018) to honor recipients who have contributed significantly to the advancement of twin-screw extrusion technology. This can be accomplished through experimental or theoretical achievements that provide an understanding to the fundamentals of processing material in the extruder. These experiments could include (but not limited to) work relating to solids conveying, melting, mixing, devolatilization, and pumping functions of twin screw extrusion.
https://www.facebook.com/SPE-Extrusion-Division-130403997035584/

11. FULL REFEREED JOURNAL PAPERS

J. Duhamel

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Quantitative Characterization of the Molecular Dimensions of Flexible Dendritic Macromolecules by Excimer Excimer Fluorescence. McNelles, S.; Thoma, J.; Adronov, A.; Duhamel, J. Macromolecules 2018, 51, 1586-1590.

Temperature-Controlled Interactions Between Poly(N-isopropylacrylamide) Mesoglobules Probed by Fluorescence. Fowler, M.; Duhamel, J.; Qiu, X.-P.; Korchagina, E.; Winnik, F. M. Macromolecules 2018, 51, 1946-1956.

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X. Feng

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M. Tam

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Wu Y., Zhi, Lin Y.W., Wenger A.C., Tam K.C., Tang X.S., 3-D bioprinting of liver-mimetic construct with alginate/cellulose nanocrystal hybrid bioink, Bioprinting, 2018, 9, 1-6.

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Zhang, Z., Sèbe, G., Wang, X.S., Tam, K.C., Enhanced Thermal Stability and UV Resistance of Poly(vinyl chloride) Reinforced by UV-absorbing Cellulose Nanocrystals, ACS Applied Nano Materials 2018, 1, 632-641

D Schipper

Serxho Selmani, Derek J. Schipper “Orientation Control of Molecularly Functionalized Surfaces Applied to the Simultaneous Alignment and Sorting of Carbon Nanotubes” Angew. Chem. Int. Ed. 2018, 57, 2399- 2403. Selected as Very Important Paper (VIP). Highlighted: Angew. Chem. Int. Ed. 2018, 57, 4838.

Rafael A. Mirabal, Luke Vanderzwet, Michael R. Emmett, Sara Abuadas, Derek J. Schipper "Dehydration Polymerization for Poly(hetero)arene Conjugated Polymers" Chem. Eur. J. 2018, 24, 12231-12235. Invited for special issue for young and emerging scientists. Selected as Hot Paper.

Serxho Selmani, Luke Vanderzwet, Andrew J. Kukor, Derek J. Schipper "Synthesis of Poly(heteroarylenevinylene) Derivatives via Rhodium-Catalyzed Hydroarylation of Alkynes" Synlett 2018, 29, 2552-2556. Invited for cluster issue on "Synthesis of Materials ".

Ryan E. Moreira, Geoffrey S. Sinclair, Derek J. Schipper "Oxidative Ring-Opening of Benzothiazole Derivatives" Can. J. Chem. 2018, In Press, DOI: 10.1139/cjc-2018-0459.

C. Tzoganakis

S. Nie and C. Tzoganakis (2018). "Tailor-Made Controlled Rheology Polypropylenes from Metallocene and Ziegler-Natta Resins, Polym.Eng.Sci., accepted.

P. Sardashti, K. Stewart, M. Polak, C. Tzoganakis, and A. Penlidis (2018). "Operational Maps Between Molecular Properties and Environmental Stress Cracking Resistance (ESCR)", J. Appl. Polym. Sci., DOI: 10.1002/marc., J. APPL. POLYM. SCI. 2019, DOI: 10.1002/APP.47006

E. Vivaldo-Lima

Miguel Ángel Vega-Hernández, Alberto Rosas-Aburto, Eduardo Vivaldo-Lima*, Humberto Vázquez-Torres, Gema Susana Cano-Díaz, Patricia Pérez-Salinas, Martin Guillermo Hernández-Luna, Jorge Alcaraz-Cienfuegos, Mikhail G. Zolotukhin, "Development of polystyrene composites based on blue agave bagasse by in situ RAFT polymerization", J. Appl. Polym. Sci., 136(8), 47089, 2019, DOI: 10.1002/app.47089

Juan José Benvenuta-Tapia*, Valeria J. González-Coronel, Guillermo Soriano-Moro, Isabel Martínez-De la Luz and Eduardo Vivaldo-Lima, "Recycling of poly(ethylene terephthalate) by chain extension during n reactive extrusion using functionalized block copolymers synthesized by RAFT polymerization", J. Appl. Polym. Sci., 135, 46771, 2018, DOI: 10.1002/app.46771

Juan José Benvenuta-Tapia*, José A. Tenorio-López, and Eduardo Vivaldo-Lima, "Estimation of Reactivity Ratios in the RAFT Copolymerization of Styrene and Glycidyl Methacrylate", Macromol. React. Eng., 12, 1800003, 1-10, 2018, DOI: 10.1002/mren.201800003

Samira Masoumi, Thomas A. Duever, Alexander Penlidis, Reza Azimi, Porfirio López-Domínguez and Eduardo Vivaldo-Lima*, "Model discrimination between RAFT polymerization models using sequential Bayesian methodology", Macromol. Theory Simul., 27, 1800016, 1-11, 2018, DOI: 10.1002/mats.201800016

Juan José Benvenuta-Tapia*, Eduardo Vivaldo-Lima, José Alfredo Tenorio-López, María de los Ángeles Vargas-Hernández, Humberto Vázquez-Torres, "Kinetic analysis of the RAFT copolymerization of styrene and maleic anhydride by differential scanning calorimetry", Thermochim. Acta, 667, 93-101, 2018, DOI: 10.1016/j.tca.2018.07.013

Porfirio López-Domínguez, Gabriel Jaramillo-Soto, and Eduardo Vivaldo-Lima*, "A modeling study on the RAFT polymerization of vinyl monomers in supercritical carbon dioxide", Macromol. React. Eng., 12(4), 1800011, 1-10, 2018, DOI: 10.1002/mren.201800011

Porfirio López-Domínguez, Jessica Olvera-Mancilla, Joaquín Palacios-Alquisira, Larissa Alexandrova, Marc A. Dubé, and Eduardo Vivaldo-Lima*, "Kinetic Modeling of Vinyl Acetate Telomerization Catalyzed by Metal Transition

Complexes under Thermal and Microwave Heating", J. Macromol. Sci., Pure Appl. Chem., 55(3), 231-242, 2018, DOI: 10.1080/10601325.2018.1424549

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X. Wang

Zhang, Z.; Wang, X. S.*; Tam, K. C.*; Sebe, G.* A comparative study on grafting polymers from cellulose nanocrystals via surface-initiated atom transfer radical polymerization (ATRP) and activator re-generated by electron transfer ATRP. Carbohydrate Polymers, 2019, 205, 322-329.

Zhang, Z.; Tam, K. C.*; Sebe, G.* Wang, X. S.*; Convenient characterization of polymers grafted on cellulose nanocrystals via SI-ATRP without chain cleavage. Carbohydrate Polymers, 2018, 199, 603-609.

Cao, K.; Peng, L.; Worku, A.; Zhu, J. Feng, A. Liu, D. Liu, S. Lin, J. *; Yuan, J. *; Wang, X. S.* Chain Conformation-Directed Polymerization Cyclization for Effective Synthesis of Macrocycles in Bulk, Chemistry-A Eur. J. 2018, 24, 15380-15386.

Ye, Q. Q.; Huo, M.; Zeng, M.; Liu, L.; Peng, L.; Wang, X. S.*; Yuan, J. Y.* Photoinduced Reversible Worm-to-Vesicle Transformation of Azo-Containing Block Copolymer Assemblies Prepared by Polymerization-Induced Self-Assembly. Macromolecules, 2018, 51, 3308-3314.

Zhang, Z.; Sebe, G.*; Wang, X. S.*; Tam, K. C.* Inverse Pickering Emulsions Stabilized by Cinnamate Modified Cellulose Nanocrystals as Templates To Prepare Silica Colloidosomes. ACS Sustainable Chem & Eng. 2018, 6, 2583-2590.

Liu, D.; Wang, X. S. Hierarchical Self-Assembly Induced by Dilution-Enhanced Hydrophobic Hydration, Chem. Eur. J. 2018, 24, 6737-6741.

Zhang, Z.; Sebe, G.* Wang, X. S.*; Tam, K. C*. Gold nanoparticles stabilized by poly(4-vinylpyridine) grafted cellulose

B. <u>Zhao</u>

Aleksander Cholewinski*, Fut (Kuo) Yang*, and Boxin Zhao†, "Algae-Mussel "Wet" Adhesives Utilizing Coordination Chemistry to Link Adhesion and Cohesion", Materials Horizons, Accepted, Nov, 2018

Che Zhang, Li Yu, Fatemeh Ferdosian, Sucharita Vijayaraghavan, Julien Mesnager, Veronique Jollet, Boxin Zhao † " Behavior of water/pMDI Emulsion Adhesive on Bonding Wood Substrate with Varied Surface Properties" ACS Industrial & Engineering Chemistry Research, Accepted, Nov 7, 2018

Wei Zhang†, Pan Feng, Jian Chen, Zhengming Sun, Boxin Zhao, "Flexible Energy Storage Systems Based on Electrically Conductive Hydrogels", Progress in Polymer Science, Accepted, Sept 1, 2018.

Pengxiang Si*, Li Chen**, Li Yu** and Boxin Zhao†, "Dual Colorimetric and Conductometric Responses of Silver Decorated Polypyrrole Nanowires for Sensing Organic Solvents of Varied Polarities" ACS applied materials and interface, Accepted, Aug 20, 2018.

Li Yu**, Hamed Shahsavan*, Geoffrey Rivers*, Che Zhang*, Pengxiang Si* and Boxin Zhao†, "Programmable 3D Shape Changes in Liquid Crystal Polymer Networks of Uniaxial Orientation", Advanced Functional Materials, Accepted, June 28, 2018.

Geoffrey Rivers*,†, Pearl Lee-Sullivan; Boxin Zhao, "How Interface Compatibility Affects Conductivity Evolution of Silver Nanobelts-filled Electrically Conductive Composites During Cure and Post-Treatments", Physical Chemistry Chemical Physics, Accepted, June 12, 2018.

Zihe Pan*†, Ran Peng, Juntao Tang, Li Chen, Fangqin Cheng, Boxin Zhao†, "Surface Segregation Induced Nanopapillae on FDTS Blended PDMS Film and Implications in Wettability, Adhesion and Friction Behaviors", ACS Applied Materials & Interfaces, 2018, 10(8): 7476-7486.

Zihe Pan*†, Fangqin Cheng, Boxin Zhao†, "Bio-inspired Polymeric Structures of Special Wettability and Their Applications: An Overview", MDPI Polymers, 2017, 9(12): 725.

Pengxiang Si*, Josh Trinidad*, Li Chen**, Brenda Lee, Alex Chen, John Persic, Robert Lyn, Zoya Leonenko and Boxin Zhao†; "PEDOT:PSS Nano-gels For Highly Electrically Conductive Silver/Epoxy Composite Adhesives", J. Materials Science: Materials in Electronics, 2018, 29(3): 1837-1846.

13. CONFERENCE PRESENTATIONS/INVITED SEMINARS

X. Feng

J. Du, K. Ku, X. Feng (2018), "A non-thermal process to extract aroma compounds from coffee using membranes," 2018 AIChE Annual Meeting, Pittsburgh, PA, Oct 28-Nov 2, 2018.

E. Halakoo, X. Feng (2018), "Modification of thin film composite membranes for desalination of high salinity water," presented at the 68th Canadian Chemical Engineering Conference, Toronto, Oct 28-31, 2018.

X. Cao, H.-S. Lee, X. Feng (2018), "Extraction of dissolved methane from aqueous solutions by membranes," presented at the 68th Canadian Chemical Engineering Conference, Toronto, Oct 28-31, 2018.

S. Chen, X. Feng (2018), "PVAm/PEBAX blend membranes for carbon capture," presented at the 68th Canadian Chemical Engineering Conference, Toronto, Oct 28-31, 2018.

M. Gauthier

100th Canadian Chemistry Conference, May 2017, Toronto, ON.
"Fluorescently Labelled Latex Particles to Monitor Film Formation"

100th Canadian Chemistry Conference, May 2017, Toronto, ON.
"Characterization of Hydrophobically Modified Starch Nanoparticle by Pyrene Fluorescence"
100th Canadian Chemistry Conference, May 2017, Toronto, ON.
"Fluorescently Labelled Latex Particles to Monitor Film Formation"

100th Canadian Chemistry Conference, May 2017, Toronto, ON.
"Systematic Hydrophobic Modification of Starch with Commercially Available Substituted Succinic Anhydrides and Maleated Vegetable Oil"

100th Canadian Chemistry Conference, May 2017, Toronto, ON.
"Atom Transfer Radical Polymerization (ATRP) Grafting of Starch Nanoparticles with Sodium Acrylate"

26th International Materials Research Conference, August 2017, Cancún, México.
"Synthesis of Isoprenic Polybutadiene Macromonomers for the Preparation of Branched Polybutadiene"

International Conference on Polymers and Advanced Materials (Polymat), October 2017, Huatulco, Mexico.
"Systematic Hydrophobic Modification of Starch with Commercially Available Substituted Succinic Anhydrides and Maleated Vegetable Oil"

38th Canadian High Polymer Forum, August 2018, Gananoque, ON.
"Castor Oil–Isocyanate Prepolymers as Cross-linkers for Starch"

38th Canadian High Polymer Forum, August 2018, Gananoque, ON.
"Poly(Acrylic Acid)-Modified Starch by Cerium (IV)-Promoted Grafting"

38th Canadian High Polymer Forum, August 2018, Gananoque, ON.
"Optimizing the Grafting Reaction in the Synthesis of Arborescent Polypeptides for Drug Delivery"

27th International Materials Research Conference, August 2018, Cancún, México.
Foldon Size in Poly(L-glutamic acid) Arborescent Polymers Determined by Fluorescence.

100th Canadian Chemistry Conference, May 2017, Toronto, ON.
"Arborescent Copolymers with a Core-shell-corona Morphology as Templates for the Preparation of Metallic Nanoparticles"

26th International Materials Research Conference, August 2017, Cancún, México.
"Latex Film Formation Probed by Pyrene Excimer Fluorescence"

International Conference on Polymers and Advanced Materials (Polymat), October 2017, Huatulco, Mexico.
"Synthesis of Functional Polyisobutylene-Based Materials By "Click" Chemistry"

Universidad Nacional Autónoma de México, Mexico City, March 2017.
"Arborescent Polymers: From Basics to Recent Developments"

D Schipper

Derek J. Schipper. "Simultaneous Sorting and Alignment of Single-Walled Carbon Nanotubes" Waterloo-Technion Joint Symposium, Haifa, Israel, November 21, 2018. Invited Presentation.

Derek J. Schipper. "Simultaneous Sorting and Alignment of Single-Walled Carbon Nanotubes" 101st Canadian Chemistry Conference, Edmonton, Alberta, May 28, 2018. Invited Presentation.

A. Penlidis

Scott, A.J. and A. Penlidis (2018). Design of polymeric materials for gas sensing applications. Session C3, Catalysis and Reaction Eng. (Polymers) (Tues, Oct 30, 2018, afternoon session). 68th CSChE Conf., Toronto, ON, Canada, Oct. 28-31, 2018.

Scott, A.J. and A. Penlidis (2018). Effect of solution properties on the terpolymerization of 2-acrylamido-2-methylpropane sulfonic acid, acrylamide and acrylic acid. PRE 10, Punta Cana, Dominican Republic, May 20-25, 2018. Invited presentation.

Y. Li

Yuning Li (invited), Conjugated polymer semiconductors designed for field effect transistor based sensors, the 256th ACS National Meeting in Boston, MA, August 21, 2018.
Yuning Li (invited), Development of Functional Polymer Materials for Electronic Devices, International Conference on Energy, Materials and Photonics (EMP18), July 9, 2018, Montreal.

Yuning Li (invited), Isatin derived fused ring Conjugated polymers for organic electronics, The 8th International Symposium on Polymer Chemistry (PC2018), June 8th, 2018.

Yuning Li (symposium), Development of polymer semiconductors for organic thin film transistors, Waterloo-Technion Joint Symposium, November 21st, 2018, Haifa, Israel.

Yuning Li (invited), Conjugated polymer semiconductors designed for field effect transistor based sensors, the 256th ACS National Meeting in Boston, MA, August 21, 2018.

Yuning Li (invited), Development of Functional Polymer Materials for Electronic Devices, International Conference on Energy, Materials and Photonics (EMP18), July 9, 2018, Montreal.

Yuning Li (seminar), Development of polymer materials for printed/flexible electronics, My 1st 2018 at King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

Yuning Li (seminar), Development of functional polymers for printed electronics, July 17, 2018 at Yanshan Branch, Beijing Research Institute of Chemical Industry (BRICI), Sinopec, Beijing, China.

Yuning Li (seminar), Development of functional polymers for electrical and electronics, June 20th, 2018 at Sun Yat-sen University, Guangzhou, China.

Yuning Li (seminar), Development of new building blocks for high mobility polymer semiconductors, Tianjin University, China, June 15th, 2018.

Yuning Li (seminar), Development of functional polymer materials for printed electronics, Heilongjiang University, China, June 5th, 2018.

Yuning Li (invited), Isatin derived fused ring Conjugated polymers for organic electronics, The 8th International Symposium on Polymer Chemistry (PC2018), June 8th, 2018.

C. Tzoganakis

X. Zhang and C. Tzoganakis (2018). “Chemical Modification of Polybutene-1 Resins Through Reactive Processing”, accepted in 76th Annual Technical Conference of the Society of Plastics Engineers, Detroit, MI, March 18-21, 2019.

C. Tzoganakis (2018). “Tyromer® Rubber Devulcanization: Enabling a Truly Circular Tire-to-Tire Recycling Economy”, 34th Annual Meeting of the Polymer Processing Society, Taipei, Taiwan, May 2018.

C. Tzoganakis (2018). “Effect of Precursor Resin on The Properties of Tailor-Made Controlled Rheology Polypropylenes”, 34th Annual Meeting of the Polymer Processing Society, Taipei, Taiwan, May 2018.

C. Tzoganakis (2018). “Development of Thermoplastic Vulcanizates (TPVs) from Devulcanized Scrap Rubber”, Extrusion Minitec Conference, Society of Plastics Engineers (SPE), Detroit, MI, June 14, 2018.

C. Tzoganakis (2018). “Compounding of Plastic Wood Composites’, LG Hausys, Seoul, Korea, March 23, 2018.

C Tzoganakis (2018). “Scrap Tire Rubber Devulcanization with Supercritical CO2”, LG Hausys, Seoul, Korea, March 23, 2018.

C Tzoganakis (2018). “Scrap Tire Rubber Devulcanization with Supercritical CO2”, Anhui GVG New Material Co. Ltd, Anhui, China, March 21, 2018.

E. Vivaldo-Lima

"Kinetic approximation with gel effect of the RAFT copolymerization of styrene-glycidyl methacrylate mediated by 2-cyano isopropyl dodecyl trithiocarbonate and 1, 10-azobis(cyclohexane carbonitrile) as initiator" (poster), Norma García Navarro, Juan José Benvenuta Tapia, Eduardo Vivaldo Lima, María de Jesús García Pérez, Miguel Ángel Ríos Enríquez, José Alfredo Tenorio López, International-Mexican Congress on Chemical Reaction Engineering (IMCCRE 2018), Mazatlán, Mexico, June 10-13, 2018.

"DEVELOPMENT OF AGAVE FIBER-g-ACRYLIC ACID COPOLYMERS BY RAFT POLYMERIZATION" (poster), Miguel Ángel Vega Hernández, Patricia Perez Salinas, Gema Susana Cano Díaz, Ricardo Casarrubias, Humberto Vázquez Torres, Alberto Rosas Aburto, Eduardo Vivaldo Lima, XXVII International Materials Research Congress, Cancún, Q.R., August 19-24, 2018.

"INFLUENCE OF CHEMICAL MODIFICATIONS ON AGAVE BAGASSE" (poster), Gema Susana Cano Díaz, Alberto Rosas Aburto, Leticia Flores Santos, Miguel Ángel Vega Hernández, Eduardo Vivaldo Lima, Ricardo Cosarrubias, XXVII International Materials Research Congress, Cancún, Q.R., August 19-24, 2018.

"Modeling of polymer network formation by RAFT copolymerization of vinyl/divinyl monomers in supercritical carbon dioxide", Porfirio López-Domínguez, Julio C. Hernández-Ortiz, and Eduardo Vivaldo-Lima, XI International Symposium: "Chemical Research at the Border Region", Tijuana, B.C., November 14-16, 2018.

"Enfoque teórico-experimental para el estudio de procesos novedosos de polimerización o modificación química de polímeros" (Theoretical-Experimental approach to the study of novel polymerization and chemical polymer modification processes), conferencia invitada (invited presentation)) para la "semana de la ingeniería química" (Chemical Engineering week), FES-Zaragoza, UNAM, Ciudad de México, September 19, 2018.

X. Wang

Guelph University, Synthesis and supramolecular chemistry of metal carbonyls, 5 Dec, 2018

National Chiao Tung University, Supramolecular chemistry, 5 July, 2018.

Jilin University, Changchun, China, Synthesis and self-assembly of metal carbonyls, May 26, 2018.

Shanghai University of Science & Technology, Synthesis and self-assembly of metal carbonyls, Oct 14, 2018.

Donghua University, Synthesis and self-assembly of metal carbonyls, Oct 13, 2018

Dalian University of technology, Synthesis and self-assembly of metal carbonyls, July 28, 2018

Xiaosong Wang 101st Canadian Chemistry Conference and Exhibition, Edmonton, Albert2018, May 27-May 31.

Xiaosong Wang The 8th international symposium on polymer chemistry, Changchun, China, 2018, June 6-9.

Xiaosong Wang 100th Canadian Chemistry Conference and Exhibition, Toronto ON 2017, May 28-June 1.

B. Zhao

Hamed Shahsavan*, Li Yu**, Antal Jákli, and Boxin Zhao†, "Smart Biomimetic Micro/ Nano- structures Based on Liquid Crystal Elastomers", Proceedings of 41th Annual Meeting of The Adhesion Society, San Diego, Feb. 15-18, 2018.

Pengxiang Si*, Li Chen, and Boxin Zhao, Water based polypyrrole-polyurethane composite ink for E-textile wearable electronics, 4th International Conference on Nanojoining and Microjoining 2018, Nara, Japan, Dec 2-5, 2018

Geoffrey Rivers*, Pearl Lee-Sullivan, Boxin Zhao, " Path-Dependence in Evolution of Electrical Conductivity in Curing Hybrid Nanocomposites: Important Effects Revealed When Studying Silver Nanobelts in a DGEBA/TETA Epoxy Matrix", The 18th European Conference on Composite Materials (ECCM18), Athens, Greece, 24-28 June 2018.

Pengxiang Si*, Li Chen, and Boxin Zhao, Alex Chen, John Persic and Robert Lyn, "Stretchable polyurethane-based conductive ink for e-textile applications", International Conference on Soldering and Reliability (ICSR), Toronto, Canada May, 2018.

Boxin Zhao, "Biomimetic interfacial engineering and smart polymers for soft robotic devices", 3rd International conference on Polymer Science and Engineering (PSA 2018), Beijing, China, Dec 13-16, 2018 (keynote speech)

Boxin Zhao, "Dopamine-functionalized Polypyrrole Nanostructures", 5th International Conference and Exhibition on Polymer Chemistry, August 27-28, 2018 Toronto, Ontario, Canada (keynote speech)

Boxin Zhao, "Bio-adhesion and Interfacial Material Engineering for Advanced Manufacturing, Tsinghua University, July 4, 2018 (invited seminar)

Boxin Zhao, "Bio-inspired Interfacial Engineering and Bionanomaterials", International Symposium of Nanotechnology - Smart and Functional Materials Thematic Presentation, WIN, Waterloo, June 2018. (invited seminar)

14. PATENTS/MAJOR TECHNICAL REPORT/CHAPTERS IN BOOKS/OTHER

B. Zhao

Fut (Kuo) Yang and Boxin Zhao, "Method and Apparatus for Adhesive Bonding in an Aqueous Medium", US patent application (14/360,986) awarded on 25/01/2018.

Boxin Zhao and Li Yu, "Composition, Methods, and Processes for Liquid crystal polymer networks –based 3D programmable actuators" Provisional US Patent Application # 62/661,781, Filed on April 26, 2018

A. Penlidis

Penlidis A. (2018). Guest Editor. Water Soluble Polymers, book, 280 pages, 17 contributions, MDPI (Processes) Press.

Penlidis, A. (2017). Special Issue: Water Soluble Polymers. Editorial Note, Processes, vol 5, issue 31, 4 pgs, doi: 10.3390/pr5020031, accepted June 13 2017.

Amintowlieh, Y., C. Tzoganakis and A. Penlidis (2013). Polypropylene with improved strain hardening characteristics. 61/854,188 US provisional patent application. Refiled as 'Polypropylene with improved strain hardening characteristics and long chain branching with UV irradiation', serial # 61/995,627 (USPTO); revised in Dec 2016.

As finally accepted: Method for modifying polyolefin to increase long chain branching; Patent no.: US 9,982,099 B2; Date: May 29, 2018; 76 pgs; 29 claims, 50 drawing sheets.

Y. Li

Ngai, J. H. L; Gao, X.; Li, Y. Chapter 4: Donor–Acceptor Type Conjugated Electrochromic Polymers. In Electrochromic Smart Materials: Fabrication and Applications, Jian Wei Xu, Ming Hui Chua, Kwok Wei Shah (ed.), The Royal Society of Chemistry (ISBN 978-1-78801-143-3), 07 Jan 2019

15. OTHER HIGHLIGHTS FOR YEAR 2018

Professor Duhamel was a guest editor for an issue on Polymer Characterization in *Polymers*

Professor Duhamel was a member of the Advisory Editorial Board of *Langmuir*

Professor Duhamel was an organizer of a symposium entitled "Polysaccharides: Characterization and Modification" at the CSC in Edmonton (May 2018)

Prof Penlidis acted as journal reviewer/adjudicator for 8 manuscripts.

Prof Penlidis acted as consultant for 6 companies (Canada, USA, Europe).

Prof Penlidis served on the editorial boards of the following journals: Polymer-Plastics Techn. and Eng.; Macromol. React. Eng. (considerable work as editorial board member and adjudicating for editor); Processes (considerable work as editorial board member promoting special issues, organizing surveys and adjudicating for editor).

Prof Penlidis acted as guest-editor in 2017/2018 of a special issue on water-soluble polymers; 17 contributions; this became a book in 2018.

Professor Penlidis organized and delivered a 2-day industrial intensive short course on polymerization/ polymer characterization/ processes (the 35th North American Course), June 4-5, 2018, Mondelez International, East Hanover, NJ, USA (75 participants).

Professor Penlidis' 2018 International/national academic collaborations (regular basis with co-authored articles): UNAM (Mexico), Iran (Paints/Coatings Institute) and, more locally, University of Ottawa, UNB, Ryerson Polytechnic Univ.).

E. Vivaldo-Lima
Prof. Vivaldo-Lima acted as journal reviewer/adjudicator for 26 manuscripts in 17 different journals.

Prof. Vivaldo-Lima was named Patron of UNAM's Faculty of Chemistry Board of Trustees starting April 2018.

Prof. Vivaldo-Lima was named Member of UNAM's FES-Zaragoza Academic Judging Commission (in charge of evaluating and deciding if applying professors are granted tenure), starting September 2018.

Prof. Vivaldo-Lima continued serving on the editorial board of J. Macromol. Sci.-Pure Appl. Chem.

Prof. Vivaldo-Lima served as President of the jury board for UNAM's "Premio Universidad Nacional (PUN) and Reconocimiento Distinción Universidad Nacional para Jóvenes Académicos (RDUNJA)" (UNAM's main Awards for life long and young academics contributions, respectively), in the category of research in exact sciences (fourth year of participation, three of them as President).

Prof. Vivaldo-Lima continued serving as member of FQ-UNAM's (Faculty of Chemistry, UNAM) Research Advisory Council ("Consejo Asesor de Investigación", CAI), representing its Chemical Engineering Department (fourth year of participation).

Boxin Zhao

Guest Editor – MDPI Polymers Special Issue: "Surface modification and functional coating for polymers", Aug 2017 – June 2018 (16 papers published)

Conference session co-organizer, Advanced Functional Materials Track, 68th Canadian Chemical Engineering Conference, Toronto, Oct 2018

Conference session co-organizer, Physical Properties and Design of Bioadhesives, the 6th World Congress on Adhesion and Related Phenomena in conjunction with 41th annual meeting of the adhesion society in San Diego, Feb 25- March 1, 2018

INSTITUTE FOR POLYMER RESEARCH
CELEBRATING 34 YEARS OF OFFICIAL INSTITUTE STATUS
FORTIETH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2017
Conrad Grebel College
Great Hall
University of Waterloo, Waterloo, Ontario
Wednesday, May 9, 2018

8:30 a.m.	**Coffee**
8:50	**Welcome and Opening Remarks**
9:00 - 9:20	**Alison Scott , Chemical Engineering, Waterloo** Principal Component Analysis Applied to Polymeric Sensing Materials **(Winner of the 2017 IPR Award for Academic Excellence in Polymer Science/Engineering)**
9:20 - 10:00	Industry Speaker: **Dr. Joel Goldstein, OMNOVA Solutions Inc.** New Hydrophobic Emulsions for Release Coatings
10:00 – 10:20	**5-Min. Mini Presentations** **1) Basma Mahi** Synthesis of pH-responsive Arborescent Amphiphilic Copolymers for Drug Delivery Applications **2) Abdullah Basalem** Characterization of Gemini Surfactants and their interactions with DNA by PEF **3) Zhen Zhang** UV-absorbing Cellulose Nanocrystals as Functional Reinforcing Fillers in Poly (vinyl chloride) Film **4) Serxho Selmani** Access to Poly(heteroarylene–vinylene)s via Rhodium(III)–Catalyzed Hydroarylation of Alkynes
10:20 – 11:00	**Coffee and Posters**
11:00 - 11:20	**Janine Thoma** Characterizing the Molecular Dimensions of Flexible Dendrimers in Solution
11:20 – 11:40	**Sanjay Patel** Detecting Minute Quantities of Nitroaromatic Compounds with Pyrene-Labeled Starch Nanoparticles
11:40 – 12:00	**5-Min. Mini Presentations** **5) Pengxiang Si** Synthesis of Water Dispersible Polypyrrole (PPy) Nanowires **6) Che Zhang** Behaviour of pMDI and Water as a Wood Adhesive on the Wood Chips of Various Hydrorphobicity **7) Jenner Ngai** Low-cost Synthetic Approach to Prepare Indigoid-based Polymers for Solution Processable P-type Organic Field-effect Transistors

8) Jingqi Wang
Characterization of Self-Assembling Quinoline-Based Foldamers by Fluorescence Anisotropy

12:00 - 1:00 **Lunch**

1:00 - 1:40 **Industry Speaker Dr. David Campbell, BASF**
High Temperature Radical Polymerization – from Inception to Commercial Practice

1:40 – 2:00 **Junjie Yin**
Production and Analysis of Highly Monodisperse Oligomeric Poly(Ethylene Oxide)

2:00 – 2:20 **Noushin Majdabadifarahani**
An Overview of Model Discrimination Techniques in Polymerization Processes

2:20 - 2:40 **Remi Casier , Chemistry, Waterloo**
Long Range Polymer Chain Dynamics of Structured and Unstructured Polypeptides Probed by PEF
(Winner of 2017 IPR Award for Academic Excellence in Polymer Science/Engineering)

2:40 - 3:05 **5-Min. Mini Presentations**

9) Kiarash Gholami
Effect of Solution Temperature on the Properties of Pour Point Depressant Mimics in Octane and Oil

10) Zehou You
Probing the Effect of Low Molecular Weight Polymer Diluent on Latex Film Formation by Pyrene Excimer Fluorescence (PEF)

11) Xiaocheng Zhou
New Conjugated Building Block IBDP For Organic Solar Cell

12) Xiguang Gao
Epoxy resin enabled robust and multifunctional binders for high energy lithium-sulfur batteries

13) Mohammed Awed
Improving MMA Monomer Conversion Via AGET ATRP Using Two Step Method in Emulsion System

3:05 - 3:40 Coffee and Posters

3:40 - 4:00 **Damin Kim**
Compression of Nano-sized Amylopectin Fragments Probed by PEF in DMSO

4:00 - 4:20 **Dapeng Liu**
Dilution-Induced Hierarchical Self-Assembly of nanovesicles: the Role of Hydrophobic Hydration

4:20 - 4:40 **Joseph Khouri**
Viscoelastic Response of Crosslinked Chitosan Edible Films

4:40 - 5:00 **Sara Abuadas**
Dehydration Polymerization for Poly(hetero)arene Conjugated Polymers

5:00 – 6:00 **Poster Session and Closing remarks**

6:30- 9:00 **IPR DINNER**
University Club, Main Dining Room

INSTITUTE FOR POLYMER RESEARCH
FORTIETH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING 2018
POSTER SESSION
WEDNESDAY, MAY 9, 2018
CONRAD GREBEL

Jenner Ngai Chem. Eng., Waterloo	New Conjugated Building Block IBDP For Organic Solar Cell
Geoffrey Sinclair Chemistry, Waterloo	Directed Oxidation of Thiazoles for use in Conjugated Polymer Synthesis
Prachi Panchal and Thipisha Sivakumaran Chem. Eng., Waterloo	Polymeric Sensing Materials for Acetone Detection
Rafael Mirabal Chemistry, Waterloo	Palladium Pre-Catalyst for Direct Arylation Polymerization
Hunter Little Chemistry, Waterloo	Probing the Conformation of OPV-Labelled Foldamers in Solution using Time Resolved Fluorescence Anisotropy
Xiaocheng Zhou Chem. Eng., Waterloo	New Conjugated Building Block IBDP For Organic Solar Cell
Ryan Amos Chemistry, Waterloo	Systematic Hydrophobic Modification of Starch with Commercially Available Substituted Succinic Anhydrides and Maleated Vegetable Oil
Janine Thoma Chemistry, Waterloo	Characterizing the Dimensions and Dynamics of Pyrene Labeled Dendritic Macromolecules in Solution
Damin Kim Chemistry, Waterloo	Characterization of Hydrophobically Modified Starch NanoParticle by Pyrene Fluorescence
Remi Casier Chemistry, Waterloo	Using Pyrene Excimer Fluorescence to Probe Intermolecular Forces
Abdullah Ba Salem Chemistry, Waterloo	Probing the Interactions Between Pyrene-Labeled Gemini Surfactant and Sodium Dodecylsulfate (SDS) by Fluorescence
Mustafa Shahwan Chem. Eng., Ryerson	Modeling of PVA degradation in a contentious photochemical reactor using experimental step-testing and process Identification

THIRTY-EIGTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING
May 9, 2018--CONRAD GREBEL COLLEGE

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THIRTY-EIGTH ANNUAL SYMPOSIUM
ON POLYMER SCIENCE/ENGINEERING
May 3, 2017--CONRAD GREBEL COLLEGE

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18-001 **Kinetic Modeling of Vinyl Acetate Telomerization Catalyzed by Metal Transition Complexes under Thermal and Microwave Heating**

P. López-Domínguez[1], J. Olvera-Mancilla[2], J. Palacios-Alquisira[2], L. Alexandrova[3], M. A. Dubé[4], and E. Vivaldo-Lima[1,*]
Journal of Macromolecular Science, Part A: Pure and Applied Chemistry Engineering Acc. 01/18

18-002 **Constitutive equations and finite element implementation of isochronous nonlinear viscoelastic behaviour**

H. Sepiani, M. Polak and A. Penlidis
Journal of Eng. Mat. and Techn. 01/18

18-003 **Ready-to-Use Computational Package for Copolymerization Reactivity Ratio Estimation: Improved Access to the Error-in-Variables-Model**

A. Scott and A. Penlidis
Processes Special Anniversary Issue 01/18

18-004 **A new n-type polymer based on N,N'-dialkoxynaphthalenediimide (NDIO) for organic thin-film transistors and all-polymer solar cells**

Y. He, X. Li, H. Liu, H. Meng, G. Y. Wang, J. Wang, Y. Li and B. Cui
J. Mater. Chem. C 01/18

18-005 **Intelligent Monte Carlo: A new paradigm for inverse polymerization engineering**

Y. Mohammadi*, M. Reza Saeb, A. Penlidis*, E. Jabbari, P. Zinck*, F. J. Stadler, K. Matyjaszewski
Macromol. Theory and Simul 01/18

18-006 **Quantitative Characterization of the Molecular Dimensions of Flexible Dendritic Macromolecules in Solution by Pyrene Excimer Fluorescence**

S. McNelles,[1] J. Thoma,[2] A. Adronov,*[1] J. Duhamel*[2]
Macromolecules 01/18

18-007 **Temperature-Controlled Interactions Between Poly(*N*-isopropylacrylamide) Mesoglobules Probed by Fluorescence**

M. Fowler, J. Duhamel, X. Qiu, E. Korchagina, F. Winnik
Macromolecules 02/18

18-008 **Dehydration Polymerization for Poly(hetero)arene Conjugated Polymers**

D. Schipper, R. Mirabal, L. Canderzet, S. Abuadas, M. Emmett
Chemistry A European Journal 02/18

18-009 **A modeling study on the RAFT polymerization of vinyl monomers in supercritical carbon dioxide**

P. López-Domínguez, Dr. G. Jaramillo-Soto, Prof. E. Vivaldo-Lima
Macromolecular Reaction Engineering 03/18

18-010 **Estimation of Reactivity Ratios in the RAFT Copolymerization of Styrene and Glycidyl Methacrylate**

J. Benvenuta-Tapia, J. Tenorio-Lopez, E. Vivaldo-Lima
Macromolecular Reaction Engineering 03/18

18-011 **pH-Triggered Release of an Antifungal Agent from Polyglycidol-Based Nanoparticles Against Fuel Fungus H. resinae**

M. Neqal, J. Fernandez, V. Coma, M. Gauthier, and V. Heroguez
Journal of Colloid & Interface Science 03/18

18-012 **Pyrene Excimer Fluorescence as a Direct and Easy Experimental Means to Characterize the Length Scale and Internal Dynamics of Polypeptide Foldons**

R. Casier and J. Duhamel*
Macromolecules 04/18

18-013 **Ionically Cross-linked PEDOT:PSS as a multi-functional conductive binder for high-performance lithium-sulfur battery**

L. Yan, X. Gao, J. Thomas, N. Jenner, H. Altounian, K. Leung, Y. Meng, and Y. LI*
Sustainable Energy Fuels 04/18

18-014 **'Optimulation' in Chemical Reaction Engineering: The Oxidative Coupling of Methane as a Case Study**

Y. Mohammadi and A. Penlidis*
Ind & Eng Chem Res, Acc. 06/18

18-015 **Binary vs. Ternary Reactivity Ratios: Appropriate Estimation Procedures with Terpolymerization Data**

A. Scott and A. Penlidis*
European Polymer Journal, Acc. 06/18

18-016 **Recycling of poly(ethylene terephthalate) by chain extension during reactive extrusion using functionalized block copolymers synthesized by RAFT polymerization**
J Benvenuta-Tapia, V. Gonzalez-Coronel, G. Sorinao-Moro, I. Martinez-De la Luz, and E. Vivaldo-Lima*
Applied Polymer Science, Acc. 06/18

18-017 **A novel epoxy resin-based cathode binder for low cost, long cycling life, and high-energy lithium-sulfur battery**

J. Yan, X. Gao, F. Wahid_Pedro, J. Quinn, Y. Meng, and Y. Li*
Journal of Materials Chemistry A., Acc. 06/18

18-018 **Application of Pyrene Fluorescence to the Characterization of Hydrophobically Modified Starch Nanoparticles**

D. Kim, R. Amos, M. Gauthier* and J. Duhamel*
Langmuir, 06/18

18-019 **Application of Pyrene Fluorescence to the Characterization of Hydrophobically Modified Starch Nanoparticles**

P. Arczewska, M. Polak, A. Penlidis*
ASCE J of Mat Civ Eng, 06/18

18-020 **Programmable 3D Shape Changes in Liquid Crystal Polymer Networks of Uniaxial Orientation**

L.Uy, H. Shahsavan, G. Rivers, X. Zhang, P. Si and B. Zhao*
Advanced Functional Materials, 06/18

18-021 **Operational Maps Between Molecular Properties and Environmental Stress Cracking Resistance (ESCR)**

P. Sardashti, K. Stewart, M. Polak, C. Tzoganakis, and A. Penlidis*
J. Appl. Poly. Sci., 07/18

18-022 **Hydrophobic and Elastic Forces Experienced by a Series of Pyrene End-Labeled Poly(ethylene oxide)s Interacting with Sodium Dodecyl Sulfate Micelles**

J. Raimbault, R. Casier, H. Little and J. Duhamel*
Macromolecules 07/18

18-023 **Kinetic analysis of the RAFT copolymerization of styrene and maleic anhydride by differential scanning calorimetry**

J Benvenuta-Tapia*, E. Vivaldo-Lima, J. Tenorio-Lopez, M. Vargas-Hernandez, and H. Vazquez-Torres
Thermochimica Acta 07/18

18-024 **Development of Polystyrene Composites based on Blue Agave Bagasse by in-situ RAFT Polymerization**

M. Vega-Hernández, A. Rosas-Aburto, E. Vivaldo-Lima, H. Vázquez-Torres, G. Susana Cano-Díaz, P. Pérez-Salinas, M. Guillermo Hernández-Luna, J. Alcaraz-Cienfuegos, M. G. Zolotukhin
Journal of Applied Polymer Science, 08/18

18-025 **Dual Colorimetric and Conductometric Responses of Silver decorated Polypyrrole Nanowires for Sensing Organic Solvents of Varied Polarities**

P. Si, L. Chen, L. Yu, and B. Zhao
ACS Applied Materials & Interfaces, 08/18

18-026 **Synthesis of Carboxylated Derivatives of Poly(isobutyleneco-isoprene) by Azide-alkyne "Click" Chemistry**

V. Deepak, I. Mahmud, and M. Gauthier
Polymer Journal, 09/18

18-027 **Porous Chitosan Microspheres as Microcarriers for 3D Cell Culture**

K. Huang, L. Xiao, A. Poudel, J. Li, P. Zhou, H. Liu, Z. Wu, G. Yang, and M. Gauthier
Carbohydrate Polymers, 09/18

18-028 **Electrically Conductive Hydrogels for Flexible Energy Storage Systems**

W. Zhang, P. Feng, J. Chen, Z. Sun and B. Zhao*
Progress in Polymer Science, 09/18

18-029 **Arborescent Poly(L-glutamic acid)s as Standards to Study the Dense Interior of Polypeptide Mesoglobules by Pyrene Excimer Fluorescence**

T. Hall, G. Whitton, R. Casier, M. Gauthier, J. Duhamel*
Macromolecules, 09/18

18-030 **Dynamic Bifurcation MEMS Gas Sensors**

M.S. Al-Ghamdi, M.E. Khater, K.M.E. Stewart, A. Alneamy, E.M. Abdel-Rahman, and A. Penlidis*
Journal of Micromechanics and Microengineering, 11/18

18-031 **Development of a Hydrophilic Lipophilic Balanced Thin Film Solid Phase Microextraction Device for Balanced Determination of Volatile Organic Compounds**

J. Grandy, V. Singh, M. Lashgari, M. Gauthier, and J. Pawliszyn*
Analytical Chemistry, 11/18

18-032 **Behavior of water/pMDI Emulsion Adhesive on Bonding Wood Substrate with Varied Surface Properties**

B. Zhang, F. Ferdosian, S. Vijayaraghavan, J. Mesnager, V. Jollet, B. Zhao*
Industrial and Engineering Chemistry Research, 11/18

18-033 **Algae-Mussel-Inspired Hydrogel Composite Glue for Underwater Bonding**

A. Cholewinski, F. Yang and B. Zhao*
Materials Horizons, 11/18

18-034 **Magnetic Polyion Complex Micelles for Cell Toxicity Induced by Radiofrequency Magnetic Field Hyperthermia**

V. Nguyen, M. De Pauw-Gillet, M. Gauthier and O. Sandre*
Nanomaterials, 12/18

18-035 **Polymerization Data Mining: A Perspective**

Y. Mohammadi and A. Penlidis*
Advanced Theory and Simulations. Nanomaterials, 12/18

APPENDIX 4

Research Personnel (S U P E R V I S O R)

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	DS	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
A. Albiladi	1	ChE				**X**									Seawater desalination by membranes	Dec 19
S. Abuadas	1	Chem							**X**						Iterative Oxidation/Dehydration Strategy to Access Well-Defined Large Conjugated Molecules	April 19
S Alharthi	2	ChE									X				Functionalized cellulose nanocrystals for waste water treatment	Dec 20
F Alsaadi	1	ChE				X									Water desalination	Dec 20
R. Amos	2	Chem					X								Hydrophobic Modification of Starch Nanoparticles	Aug 18
P. Ataeian	2	ChE									X				Bioflocculant using sustainable nanomaterials	Aug 20
J Baek	2	ChE									X				Double Pickering emulsions using modified CNC in food products	Aug 20
A Ba Salem	2	Chem		X											Probing the Interactions between Pyrene-labeled Gemini Surfactants and DNA by Fluorescence	Sept 20
X Cao	2	ChE				X									Phenolic compound removal from wastewater	Aug 21
R. Casier	2	Chem		X											Probing Protein Folding by Pyrene Excimer Fluorescence	Dec 19
S. Chen	2	ChE				x									Membranes for gas separations	Dec 19
A. Cholewinski	2	ChE												x	Functionalized alginate tissue adhesives	Aug 18
L. DaPeng	2	Chem											X		Self-assembly of PFpP for functional nanomaterials	Sep 18
N. Dasgupta	1	Chem					X								Thermoresponsive Starch Nanoparticles for Oil Extraction	Aug 20
C Dutchmann	1	ChE									X				Antimicrobial systems	Aug 20
J. Fernandez	2	Chem					X								Grafting of Starch Nanoparticles	Aug 18
N Francis	1	ChE								X					Aqueous phase terpolymerization studies	Sept 20
F Frasca	1	Chem		X											Characterization of PIBSA-Based Dispersants by Pyrene Excimer Fluorescence	Aug 20
X Gao	1	ChE						X							Designing3D CrosslinkedPolymer Bindersfor High Energy Density and Long Cycle Life Lithium-Sulfur Batteries	May 21
N. Grishkeweich	2	Chem									X				Sustainable nanomaterials for water treatment	April 19
C Guo	1	ChE						X							Functional polymers for lithium sulfur batteries	Sept. 21

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	DS	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
E. Halakoo	2	ChE				x									Wastewater treatment with membranes	Aug 19
M Isalam	2	ChE									X				Cellulose nanocrystals for biomedical applications	Aug 21
J Jardin	1	ChE									X				Antimicrobial rubber gloves	Aug 20
D Kim	1	ChE									X				Functional cellulose for the treatment of sea lice in salmon	June 20
D Kim	2	Chem		X											Characterization of Modified Starch Nanoparticles by Fluorescence	Dec 20
J Khouri	2	ChE								X					Edible films based on chitosan	Sept 19
M Kulak	2	Chem							X						Simultaneous Sorting and Alignment of Single- Walled Carbon Nanotubes	Sep 20
P. Kumar	2	ChE						X							Optimizing polymer solar cell fabrication	Sept. 22
Y Lee	2	ChE									X				Conductive cellulose nanocrystals	Aug 22
N. Lanigan	2	Chem											X		Supramolecular polymerization of metal carbonyls in solid state	Dec 18
A Leung	1	Chem											X		Synthesis and characterization of metal carbonyl macrocycles	19
L Li	2	Chem		X											Intrinsic Properties of Starch Nanoparticles Probed by Pyrene Excimer Fluorescence	Dec 19
W Li	1	ChE						X							Development of functional polymers for sensors	April 20
Z Li	2	ChE				X									Membranes for gas separations	Aug 22
A Liu	1	Chem		X			X								Synthesis and Characterization of Non-Ionic Surfactants Prepared from Furan-2-methanol Derivatives (co-supervised with J. Duhamel)	Aug 20
D. Liu	2	Chem											X		Self-assembly of metal carbonyl polymers	2018
B. Mahi	2	Chem					X								Arborescent Polypeptides for Drug Delivery (Saudi Arabia Scholarship)	Aug 20
N Maidabadifarahani	1	ChE								X					Detection of toxic analytes with polymeric materials	Sept 19
S Mathers	1	Chem							X						Directed Oxidations to Access Highly Oxidized Conjugated Materials	April 19
R. Mirabal	2	Chem							X						Synthesis of Cyclacene	Sept 20
J. Ngai	1	ChE						X							Low-cost Amide-based Donor-acceptor Polymers for Organic Electronic Devices	Dec 20
M omidvarkordshouli	4	ChE				X									Polymeric membranes for separation applications	Dec 19

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	DS	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
S Patel	1	Chem		X											Pyrene-Labeled Starch Nanoparticles for Explosive Detection	Dec 18
A Scott	2	ChE								x					Design criteria for novel functional polymeric materials for specific applications	Aug 19
S Selmani	2	Chem							X						Simultaneous Sorting and Alignment of Single- Walled Carbon Nanotubes	Sep 20
P Si	2	ChE												X	Electrically conductive polymers	
G. Sinclair	2	Chem							X						Copper Mediated Tandem C-H Bond Functionalization/C-S Bond Formation	Sep 20
C. Tang	2	ChE									X				Cellulose nanocrystals for agriculture applications	Aug 21
J. Thoma	2	Chem		X											Characterization of Polymeric Bottlebrushes by Pyrene Excimer Fluorscence	Aug 20
G Wang	1	ChE						X							Development of low cost polymer semiconductors for solar cells	April 20
H Wang	2	ChE				X									VOC capture from gas streams by membranes	Dec 21
J Wang	1	Chem							X						Synthesis of Cyclacene	Sept 19
J Wang	1	Chem		X											Characterization of the Conformation of Phenylene Vinylene Oligomers in Solution by Fluorescence Anisotropy	Aug 19
S Wang	1	Chem							X						Magentic Fields Applied to the Alignment Relay Technique	Jan 20
X. Wang	1	ChE													Degassing membranes	Aug 18
A Worku	2	Chem					X								Arborescent Micelles from Polyelectrolyte Complexes	
J Xu	2	ChE									X				Functional magnetic nanoparticls for water treatment applications	Aug 22
T. Xiao	4	ChE				X									Membranes for gas Serparations	Aug 20
F Yang	2	ChE												X	Mussel-inspired hydrogel bonding solution	Aug 20
Y.Yang	2	ChE						X							Development of organic semiconductors	Jan 17
Z You	1	Chem		X											Effect of Oligomer Presence on Polymer Diffusion During Latex Film Formation	Apr 19
Y Yuan	1	ChE						X							Development of organic semiconductors	Oct 21
J Zhang	1	Chem		X											Oil Extraction from Oil Sands with Modified Starch Nanoparticles	April 18
Y Zhang	1	ChE						X							Light harvesting management for silicon solar cells	May 2020
Z. Zhang	1	ChE						X							Processing polymer solar cell materials	May 2020

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S. Abuadas	1	Chem							**X**						Iterative Oxidation/Dehydration Strategy to Access Well-Defined Large Conjugated Molecules	April 19
S Alharthi	2	ChE									X				Functionalized cellulose nanocrystals for waste water treatment	Dec 20
F Alsaadi	1	ChE				X									Water desalination	Dec 20
R. Amos	2	Chem					X								Hydrophobic Modification of Starch Nanoparticles	Aug 18
P. Ataeian	2	ChE									X				Bioflocculant using sustainable nanomaterials	Aug 20
J Baek	2	ChE									X				Double Pickering emulsions using modified CNC in food products	Aug 20
A Ba Salem	2	Chem		X											Probing the Interactions between Pyrene-labeled Gemini Surfactants and DNA by Fluorescence	Sept 20
X Cao	2	ChE				X									Phenolic compound removal from wastewater	Aug 21
R. Casier	2	Chem		X											Probing Protein Folding by Pyrene Excimer Fluorescence	Dec 19
S. Chen	2	ChE				x									Membranes for gas separations	Dec 19
A. Cholewinski	2	ChE												x	Functionalized alginate tissue adhesives	Aug 18
L. DaPeng	2	Chem											X		Self-assembly of PFpP for functional nanomaterials	Sep 18
N. Dasgupta	1	Chem					X								Thermoresponsive Starch Nanoparticles for Oil Extraction	Aug 20
C Dutchmann	1	ChE									X				Antimicrobial systems	Aug 20
J. Fernandez	2	Chem					X								Grafting of Starch Nanoparticles	Aug 18
N Francis	1	ChE								X					Aqueous phase terpolymerization studies	Sept 20
F Frasca	1	Chem		X											Characterization of PIBSA-Based Dispersants by Pyrene Excimer Fluorescence	Aug 20
X Gao	1	ChE						X							Designing3D CrosslinkedPolymer Bindersfor High Energy Density and Long Cycle Life Lithium-Sulfur Batteries	May 21
N. Grishkeweich	2	Chem									X				Sustainable nanomaterials for water treatment	April 19

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TD=T.A. Duever JD=J. Duhamel RD=R. Dhib XF=X. Feng JF=J.Forrest MG=M. Gauthier YL=Y.Li DS=D. Schipper AP=A. Penlidis MT=M. Tam CT=C. Tzoganakis XW=X.Wang BZ=B. Zhao

NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	DS	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
C Guo	1	ChE						X							Functional polymers for lithium sulfur batteries	Sept. 21
E. Halakoo	2	ChE				x									Wastewater treatment with membranes	Aug 19
M Isalam	2	ChE									X				Cellulose nanocrystals for biomedical applications	Aug 21
J Jardin	1	ChE									X				Antimicrobial rubber gloves	Aug 20
D Kim	1	ChE									X				Functional cellulose for the treatment of sea lice in salmon	June 20
D Kim	2	Chem		X											Characterization of Modified Starch Nanoparticles by Fluorescence	Dec 20
J Khouri	2	ChE								X					Edible films based on chitosan	Sept 19
M Kulak	2	Chem							X						Simultaneous Sorting and Alignment of Single- Walled Carbon Nanotubes	Sep 20
P. Kumar	2	ChE						X							Optimizing polymer solar cell fabrication	Sept. 22
Y Lee	2	ChE									X				Conductive cellulose nanocrystals	Aug 22
N. Lanigan	2	Chem											X		Supramolecular polymerization of metal carbonyls in solid state	Dec 18
A Leung	1	Chem											X		Synthesis and characterization of metal carbonyl macrocycles	19
L Li	2	Chem		X											Intrinsic Properties of Starch Nanoparticles Probed by Pyrene Excimer Fluorescence	Dec 19
W Li	1	ChE						X							Development of functional polymers for sensors	April 20
Z Li	2	ChE				X									Membranes for gas separations	Aug 22
A Liu	1	Chem		X			X								Synthesis and Characterization of Non-Ionic Surfactants Prepared from Furan-2-methanol Derivatives (co-supervised with J. Duhamel)	Aug 20
D. Liu	2	Chem											X		Self-assembly of metal carbonyl polymers	2018
D. Mahi	2	Chem					X								Arborescent Polypeptides for Drug Delivery (Saudi Arabia Scholarship)	Aug 20
N Maidabadifarahani	1	ChE								X					Detection of toxic analytes with polymeric materials	Sept 19
S Mathers	1	Chem							X						Directed Oxidations to Access Highly Oxidized Conjugated Materials	April 19
R. Mirabal	2	Chem							X						Synthesis of Cyclacene	Sept 20
J. Ngai	1	ChE						X							Low-cost Amide-based Donor-acceptor Polymers for Organic Electronic Devices	Dec 20
M omidvarkordshouli	4	ChE				X									Polymeric membranes for separation applications	Dec 19
S Patel	1	Chem		X											Pyrene-Labeled Starch Nanoparticles for Explosive Detection	Dec 18

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NAME	CAT	DEPT	TD	JD	RD	XF	MG	YL	DS	AP	MT	CT	XW	BZ	THESIS/PROJECT TOPIC	COMPL. DATE
A Scott	2	ChE								x					Design criteria for novel functional polymeric materials for specific applications	Aug 19
S Selmani	2	Chem							X						Simultaneous Sorting and Alignment of Single- Walled Carbon Nanotubes	Sep 20
P Si	2	ChE												X	Electrically conductive polymers	
G. Sinclair	2	Chem							X						Copper Mediated Tandem C-H Bond Functionalization/C-S Bond Formation	Sep 20
C. Tang	2	ChE									X				Cellulose nanocrystals for agriculture applications	Aug 21
J. Thoma	2	Chem		X											Characterization of Polymeric Bottlebrushes by Pyrene Excimer Fluorscence	Aug 20
G Wang	1	ChE						X							Development of low cost polymer semiconductors for solar cells	April 20
H Wang	2	ChE				X									VOC capture from gas streams by membranes	Dec 21
J Wang	1	Chem							X						Synthesis of Cyclacene	Sept 19
J Wang	1	Chem		X											Characterization of the Conformation of Phenylene Vinylene Oligomers in Solution by Fluorescence Anisotropy	Aug 19
S Wang	1	Chem							X						Magentic Fields Applied to the Alignment Relay Technique	Jan 20
X. Wang	1	ChE													Degassing membranes	Aug 18
A Worku	2	Chem					X								Arborescent Micelles from Polyelectrolyte Complexes	
J Xu	2	ChE									X				Functional magnetic nanoparticls for water treatment applications	Aug 22
T. Xiao	4	ChE				X									Membranes for gas Serparations	Aug 20
F Yang	2	ChE												X	Mussel-inspired hydrogel bonding solution	Aug 20
Y.Yang	2	ChE						X							Development of organic semiconductors	Jan 17
Z You	1	Chem		X											Effect of Oligomer Presence on Polymer Diffusion During Latex Film Formation	Apr 19
Y Yuan	1	ChE						X							Development of organic semiconductors	Oct 21
J Zhang	1	Chem		X											Oil Extraction from Oil Sands with Modified Starch Nanoparticles	April 18
Y Zhang	1	ChE						X							Light harvesting management for silicon solar cells	May 2020
Z. Zhang	1	ChE						X							Processing polymer solar cell materials	May 2020

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