

THE KENNETH RUSSELL ENDOWED LECTURE

Kenneth Russell came to Queen's in 1954. He had research experience in polymer chemistry at Cambridge and Princeton, in thermodynamics of rocket fuels at Penn State and in kinetics of atom recombination at Manchester. He was known particularly for his polymer research and first year and polymer lectures (dating back to 1956). He retired officially in 1990.

His interest in polymer chemistry arose through wartime work on butyl rubber. This led to a Ph.D. thesis on isobutene polymerization by Friedel Crafts catalysts, including kinetic studies of the effects of various co-initiators. His research at Queen's led to an understanding of the dual role of a wide range of co-initiators.

Free radical studies at Princeton led to determination of transfer constants for transfer agents and retarders (still quoted in the Polymer Handbook).

His other main research areas, inspired in large measure by parallel work at Du Pont, consisted of structural studies of polyethylene and grafting of vinyl monomers to polyethylene. These carried on for 12 years into his retirement and profited from cooperation with many members of staff. A main factor in the incorporation of this lecture series was Dr. Russell's work with Drs. Whitney and Parent.

SELECTED RECENT PUBLICATIONS

- 713. S. Aghevlian, Y. Lu, M. A. Winnik, D. W. Hedley, R. M. Reilly, Panitumumab Modified with Metal-Chelating Polymers (MCP) Complexed to ^{111}In and ^{177}Lu – An EGFR-Targeted Theranostic for Pancreatic Cancer, *Molec.Pharm.*, 2018,15, 1150-1159.
- 714. H. Zhou, Y. Lu Q. Yu, I. Manners, M.A. Winnik, Monitoring collapse of uniform thermo-responsive cylindrical brushes in water, *ACS Macro Lett.* 2018, 7, 166-171.
- 715. J. Xu, H. Zhou, Q. Yu, I. Manners, M.A. Winnik, Competitive Self-Assembly Kinetics as a Route to Controlling the Morphology of Core-Crystalline Cylindrical Micelles, *J. Am. Chem. Soc.* 2018, 140, 2619-2638.
- 716. G. Guerin,* P. Rugar, I. Manners, M.A. Winnik,* Explosive Dissolution and Trapping of Block Copolymer Seed Crystallites, *Nature Commun.* 2018, 9, 1158.
- 717. Q. Yu, D. Pichugin, M. Cruz, G. Guerin,* I. Manners, M. A. Winnik*, NMR Study of the Dissolution of Core-Crystalline Micelles, *Macromolecules*, 2018, 51, 3279–3289.
- 720. C. E. Boott, E. M. Leitao, D. W. Hayward, R. F. Laine, P. Mahou, G. Guerin, M. A. Winnik, R. M. Richardson,* C. F. Kaminski,* G. R. Whittell,* I. Manners*, Probing the Growth Kinetics for the Formation of Uniform 1D Block Copolymer Nanoparticles by Living Crystallization-Driven Self-Assembly, *ACS Nano* DOI: 10.1021/acsnano.8b01353.
- 721. L. Jia, G. Guerin, Y. Lu, Q. Yu, I. Manners, M. A. Winnik*, Creating biomorphic barbed and branched structures in solution through block copolymer crystallization. *Angew. Chem.* DOI: 10.1002/anie.201809605 and 10.1002/ange.201809605.



**Department of Chemistry
Queen's University**

is honoured to host the
2018 Russell Lecturer:

Dr. Mitchell A. Winnik
University of Toronto



“Biomedical applications of metal
-chelating polymers and
lanthanide nanoparticles”

Friday, November 30, 2018
11:30 AM
Room 117, Chernoff Hall

DR. MITCHELL A. WINNIK



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Mitch Winnik is Professor of Chemistry at the University of Toronto, specializing in fundamental and applied aspects of polymer science. He received a B.A. degree from Yale University in 1965. He obtained his Ph.D. degree in the area of organic chemistry at Columbia University in 1969, working under the direction of Prof. Ronald Breslow, and then spent a year as a postdoctoral fellow in the laboratory of Prof. George Hammond at Caltech studying organic photochemistry. He joined the faculty at the University of Toronto in 1970, and received tenure as an organic chemist. On his first sabbatical, in Bordeaux France, he realized that he was bored with what he had been doing and decided to switch his attention to longer molecules (polymer chemistry). Upon his return to Toronto, he and his coworkers prepared a series of polymers with a pyrene group at both ends. The pyrene groups emit a blue fluorescence if the pyrenes are far apart, but if an excited pyrene during its lifetime can find a second pyrene, they form a sandwich structure which emits a green "excimer" fluorescence. In dilute solution, the rate of excimer formation from the end-labeled polymers measures the end-to-end cyclization rate of the polymer chain. For many years, the Winnik group used pyrene fluorescence as a probe of polymer dynamics in solution. In the early 1980's, the Winnik group broadened its interests to encompass polymers as materials. His research group provided new scientific knowledge that helped the coatings industry develop the environmentally friendly paints that are now sold commercially. In parallel, he collaborated with Ian Manners to pioneer the study of crystallization-driven self-assembly of block copolymer micelles in solution. In 2005, he joined a team of scientists who were developing mass cytometry for rapid multiparameter cell-by-cell analysis of biomarker expression. He and his students created polymer reagents for this technique. More recently, he has become involved in a collaboration to develop metal-chelating polymers into targeted reagents for radioimmunotherapy treatment of breast cancer and pancreatic cancer.

SELECTED HONOURS & AWARDS

- 1983 IBM World Trade Scholar
- 1985 Japan Society for the Promotion of Science (JSPS) Fellowship
- 1993 Chemical Institute of Canada Award in Polymer Science
- 1994 Fellow of the Chemical Institute of Canada
- 1995 Bell Canada Forum Award.
- 1996 Fellow of the Royal Society of Canada
- 1996 Alexander von Humboldt Senior Scientist Award (Germany)
- 1998 University Professor, University of Toronto.
- 1999 R.W. Tess Award in Coatings, administered by the American Chemical Society,
- 1999 - 2001 Canada Council Killam Fellowship
- 2001 Joseph J. Matiello Lecture Award, Federation of Societies for Coatings Technology
- 2004 CIC Medal. This is the highest award of the Chemical Institute of Canada for scholarly contributions to Chemistry in Canada.
- 2006 ISI Web of Science, Most-cited author in Chemistry
- 2011 LeSueur Memorial Award, Society of the Chemical Industry, Canada
- 2013 American Chemical Society Award in Applied Polymer Science
- 2014 Gerhard Kanig Lecture Award, Berlin-Brandenburg Association of Polymer Science