The Department of Chemistry
The University *of* Western Ontario

invites you to

THE PAUL de MAYO AWARD LECTURE

Dr. Paul Anthony Rupar

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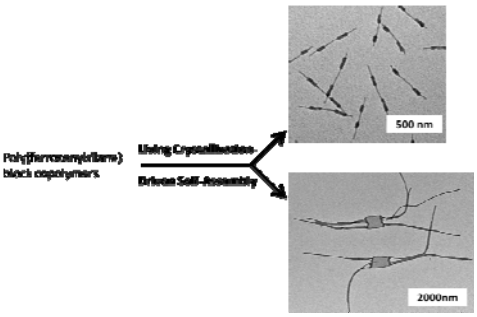
Living, Crystallization-Driven Self-Assembly of Polyferrocenylsilane Block Copolymers: A Route to Well-Defined Nanomaterials

Abstract: Block copolymers are composed of two or more chemically distinct polymer segments joined together to produce a single macromolecule. When placed in a solvent selective for one of the polymer blocks, block copolymers can self-assemble into structures called micelles. The insoluble block forms the dense core of the micelle, while the soluble polymer chains form a swollen corona. A number of different morphologies can be observed in the solution phase self-assembly of block copolymers, including spheres, cylinders, and vesicles.



The Manners group has demonstrated that block copolymers containing a short crystalline polyferrocenylsilane (PFS) block preferentially form long cylindrical shaped micelles when placed in a solvent selective for the non-PFS polymer coblock. The cylindrical shape arises out of a compromise between the crystalline PFS block's preference to form lamellar structures and the minimization of coronal interchain repulsion. Using a process that we have termed Living, Crystallization-Driven Self-Assembly (LCDSA) (a self-assembly process with characteristics similar to living polymerizations), PFS-containing cylindrical micelles of well-defined lengths, spatially segregated corona domains, and diverse structures can be constructed in a controlled, predicable, and intuitive fashion.

This presentation will provide an overview of LCDSA and its application in constructing complex nanoscale structures. Recent work on corona crosslinking of PFS containing micelles will be highlighted, including its use in controlling micelle growth for the creation of asymmetric cylindrical micelles and the formation of hierarchical superstructures.

Monday, December 19, 2011
2:30 pm — BGS 0153

ACCESSIBILITY
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