**Invited External Seminar (webinar), Tuesday, June 15, 16:00 -17:00 (zoom platform)**

**Nanostructured Hybrid Materials by Atom Transfer Radical Polymerization**

**Krzysztof Matyjaszewski**

*Carnegie Mellon University, Center for Macromolecular Engineering, Pittsburgh, PA, 15213, USA*

[*matyjaszewski@cmu.edu*](mailto:matyjaszewski@cmu.edu)

Many advanced nanostructured functional materials were recently designed and prepared by reversible deactivation radical polymerization. Copper-based ATRP (atom transfer radical polymerization) catalytic systems with polydentate nitrogen ligands are among most efficient reversible deactivation radical polymerization systems.Recently, by applying new initiating/catalytic systems, Cu level in ATRP was reduced to a few ppm. ATRP of acrylates, methacrylates, styrenes, acrylamides, acrylonitrile and other vinyl monomers was controlled by various external stimuli, including electrical current, light, mechanical forces and ultrasound, also in the presence of air. ATRP was employed for synthesis of polymers with precisely controlled molecular architecture with designed shape, composition and functionality. Block, graft, star, hyperbranched, gradient copolymers, molecular brushes, various hybrid materials and bioconjugates were prepared with high precision. Special emphasis will be on nanostructured multifunctional hybrid materials for application related to biology, environment, and energy.

*www.cmu.edu/maty/members/Kris.html*

Short CV



Krzysztof (Kris) Matyjaszewski, Ph.D., professor in the department of chemistry at the Mellon College of Science, Carnegie Mellon University, is an internationally recognized polymer chemist who is highly regarded for his vision, his leadership in education and his many collaborative research efforts that have yielded significant innovations in polymer chemistry.  He is perhaps best known for the discovery of atom transfer radical polymerization (ATRP), a novel method of polymer synthesis that has revolutionized the way macromolecules are made.

Main research interests

* Macromolecular Engineering, preparation and processing of precisely controlled polymers to reach targeted materials properties. Correlation of macromolecular structure with macroscopic properties
* Synthesis of well-defined macromolecules via living and controlled polymerizations. Radical, cationic, and anionic polymerization of alkenes and heterocyclics. Block, graft and gradient copolymers. Control of chain microstructure and topology. Functional polymers and telechelics
* Preparation of well-defined polymers and hybrids for optoelectronic, biomedical and special applications.
* Inorganic and organometallic polymers
* Catalysis. Homogeneous and heterogeneous catalysis

Research Impact

* Over 100 postdoctoral fellows and 100 graduate students at CMU research group.
* 60 international companies from Europe, Japan, South Africa and North America have been members of CRP and ATRP Consortia at CMU; 17 licenses signed for ATRP technology. Commercial production of materials by ATRP has been started in Japan, USA and Europe in 2004.
* First paper and review on ATRP have been cited together >11,000 times (ISI Web of Science or >14,000 Google Scholar) and the total citation record >115,000 (ISI or >158,000 Google Scholar) ranked among top 10 scientists in all fields of chemistry world–wide in 2004-2020 (h-index 162 ISI and 191 Google Scholar).
* 24 books, 100 book chapters and 1185 peer-review papers published.
* 64 issued US patents, 36 pending US patent applications; 154 original and derived international patents.