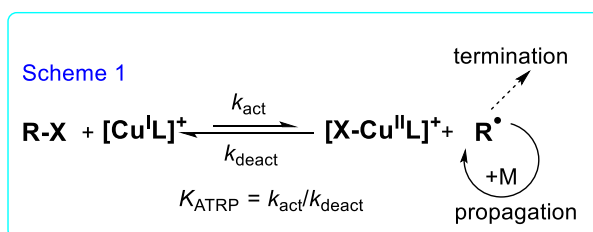


Title	Study of the activation process in atom transfer radical polymerization
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Project description:

Atom transfer radical polymerization (ATRP) is a powerful controlled radical polymerization technique, used to prepare polymers with well-defined architectures, predetermined molecular weights (MW), and low dispersities. The process is catalyzed by a copper–amine complex through a reversible equilibrium involving the activator and deactivator complexes, $[\text{Cu}^{\text{I}}\text{L}]^+$ and $[\text{X-Cu}^{\text{II}}\text{L}]^+$ ($\text{X} = \text{Cl}, \text{Br}$), respectively (Scheme 1). The success of the process relies on various parameters including the stability and reactivity of the catalyst toward initiator, dormant species and propagating radicals.



The aim of the present research project is to determine kinetic and thermodynamic parameters of relevance to the activation step of ATRP, i.e., k_{act} , k_{deact} , K_{ATRP} , and stability and halidophilicity constants of catalyst complexes. These parameters strongly depend on the nature of the solvent and, above all, on the composition of solvent/monomer mixture. The study will therefore cover a wide range of solvents and monomers that are typically used in ATRP. The study will mainly employ various electrochemical and spectrophotometric techniques.

Publications:

Fantin, M.; Isse, A.A.; Matyjaszewski, K.; Gennaro, A. *Macromolecules*, **2017**, *50*, 2696-2705.

Fantin, M.; Isse, A.A.; Bortolamei, N.; Matyjaszewski, K.; Gennaro, A. *Electrochim. Acta*, **2016**, *222*, 393-401.

Fantin, M.; Isse, A.A.; Gennaro, A.; Matyjaszewski, K. *Macromolecules* **2015**, *48*, 6862-6875.

Bortolamei, N.; Isse, A.A.; Di Marco, V.B.; Gennaro, A.; Matyjaszewski, K. *Macromolecules* **2010**, *43*, 9257-9267.

Collaborations

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