TAILOR-MADE POLYMERS BY ORGANOMETALLIC-MEDIATED RADICAL POLYMERIZATION (OMRP).

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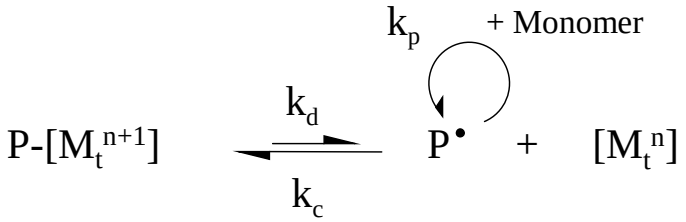
Nowadays, progress in medicine, microelectronics and many other fields is more and more sustained by the development of novel polymer materials with constantly improved properties and well-defined molecular parameters. In this context, the discovery and development of ***controlled radical polymerization*** (CRP) techniques appeared as major achievements because it paved the way to the synthesis of precise macromolecular architectures under mild experimental conditions. An emerging class of CRP today is ***Organometallic-Mediated Radical Polymerization*** (OMRP). The latter is based on the reversible deactivation of the growing radical chains by a transition metal species.[1,2] All along the polymerization, the dominating population of inactive chains is in equilibrium with a low amount of active ones, which strongly decreases the probability of irreversible termination reactions, abundant in a free radical polymerization. Although some Chromium, Titanium and Vanadium complexes have been used as regulating agents,[1] the so-called ***Cobalt-Mediated Radical Polymerization*** (CMRP) is the most efficient and versatile system, until now.[2] General mechanistic principles and synthetic progress of OMRP as well as remaining challenges will be presented in this communication.



[1] Smith, K.M; McNeil, S.; Abd-El-Aziz, A., *Macromol. Chem. Phys.,Trends in Polymer Science*, **2010**, 211, 10–16.

[2] Debuigne, A.; Poli, R.; Jerome, C.; Jerome, R.; Detrembleur, C. *Prog. Polym. Sci.* **2009**, *34*, 211.