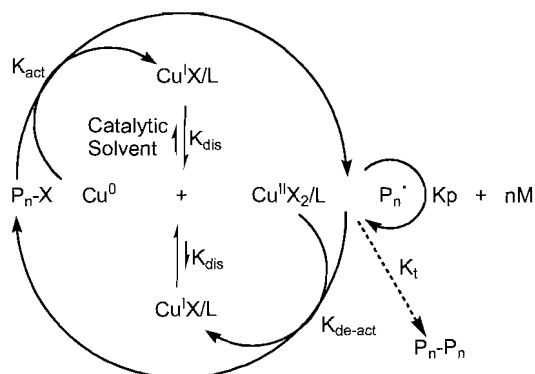


Phenols As Accelerators For Copper Mediated – Living Radical Polymerisation In Non Polar Solvents – SET vs ATRP?

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In a recent development reported by Percec *et. al.*¹ polar solvents are used in conjunction with Cu(0) which allow for the ultra-fast synthesis of polymers of ultra-high molecular weights at ambient temperature via a process termed Single Electron Transfer – Living Radical Polymerization (*SET-LRP*), scheme 1. In this work phenol has been used as an additive to enhance the rate of copper-catalyzed polymerization of methyl acrylate in toluene at ambient temperature. A direct relationship between reaction time and amount of phenol added has been found. The polymers made were of narrow PDI and of a controlled molecular weight demonstrating the robustness of the technique. A range of initiators, esters and amides were used to polymerize methyl acrylate and they all produced polymers with narrow PDI and controlled molecular weights. This demonstrates the wide range of possible initiators that could be used in SET-LRP².



Scheme 1 - Proposed Mechanism of SET-LRP¹

References

1. Percec, V.; Guliashvili, T.; Ladislaw, J. S.; Wistrand, A.; Stjerndahl, A.; Sienkowska, M. J.; Monteiro, M. J.; Sahoo, S. *J Am Chem Soc* **2006**, 128, (43), 14156-14165.
2. Guliashvili, T.; Percec, V. *Journal of Polymer Science: Part A: Polymer Chemistry* 2007, 45, 1607-1618.