

Synthesis of a well-defined polyelectrolyte by controlled/ “living” nitroxide mediated radical polymerization. Kinetic study

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The synthesis and characterization of potassium 4-styrenesulfonyl (trifluoromethylsulfonyl) imide (STFSIK) monomer as well as its controlled/living nitroxide-mediated radical polymerization (NMRP), using N-tert-Butyl-N-(2-methyl-1-phenylpropyl)-O-(1-phenylethyl) hydroxylamine as initiator in 50% w/v solutions of DMF at 125 °C, are reported. The kinetic studies of STFSIK indicated controlled/living polymerization process free of coupling and transfer reactions. ¹H-NMR and SEC were employed to determine the rate of monomer consumption and molecular weight distribution, \bar{M}_w , of the synthesized samples. The polymerization reaction established high monomer conversion in just an hour with high end-group fidelity and the ability to continue polymerization with no visible terminations. Finally, the synthesis of the corresponding PSTFSILi homopolymer was achieved through a metathesis reaction between PSTFSIK and LiClO₄, and the subsequent purification was successful against dialysis in water.

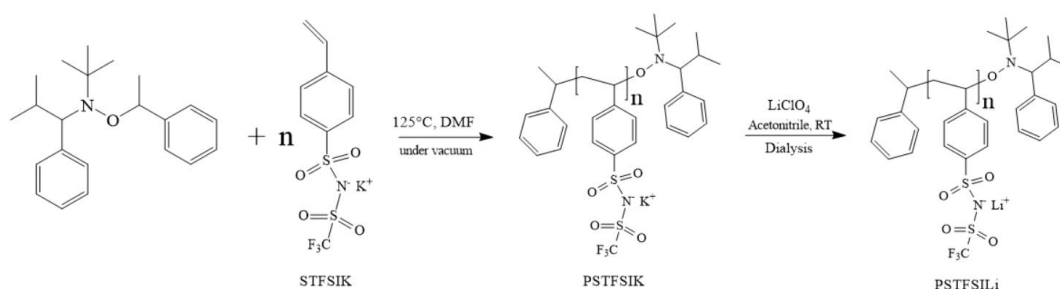


Figure 1: Polymerization of STFSIK and subsequent ion exchange to produce PSTFSILi

References:

1. C. Pantazidis, S. Andreou, E. Glynos, G. Sakellariou, *European Polymer Journal* **134**,109815 (2020)