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NITROXIDE MEDIATED "LIVING" FREE RADICAL POLYMERIZATION AIDED BY COMBINATORIAL TECHNIQUES AND MATHEMATICAL MODELING

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Abstract

In recent years "Living" (or controlled) Free Radical Polymerization (LFRP) has become one of the most active areas in polymer research. Due to the large and increasing number of new controller compounds available for carrying out LFRP, it is convenient to use a blend of high throughput techniques and traditional experimentation to test the performance of these substances for different reaction conditions and with several monomers. Combinatorial and traditional studies using several semi-commercial nitroxides have been performed for the controlled copolymerization of styrene (S) with maleic anhydride and acrylonitrile (both denoted as A). The copolymers studied have the general structure poly ((S-r-A) – b – S). Another system studied by combinatorial techniques involves the controlled grafting of elastomers with styrene. During the talk we will discuss advantages and limitations of the combinatorial experimentation performed in a Symyx Parallel Polymerization Reactor (PPR-48), as well as kinetic aspects analyzed under the light of mathematical modeling. The industrial motivation behind these studies will also be discussed