SUMMARY

[0004] This disclosure accordingly provides systems and methods for monitoring and controlling a nitroxide-based polymerization inhibitor in vinyl-based monomers, substantially in real time. The online monitoring of nitroxide-based inhibitor concentration can be correlated to an extent of undesirable polymerization. Moreover, the online monitoring of nitroxide-based inhibitor concentration can be used as an indirect probe of additional factors affecting the overall polymerization kinetics, such as the dosage of secondary slower-acting polymerization retarders or antioxidants.

[0005] In an aspect, the ~~invention~~ present disclosure provides a method of monitoring and controlling a nitroxide-based polymerization inhibitor in vinyl-based monomers. The method includes providing a dosage of the nitroxide-based polymerization inhibitor in the vinyl-based monomers. A residual concentration of the nitroxide-based polymerization inhibitor is measured substantially in real time, and an optimized dosage of the nitroxide-based polymerization inhibitor is provided in response to the measured residual concentration.

[0006] In another aspect, the ~~invention~~ present disclosure provides a system for monitoring and controlling undesirable polymerization in vinyl-based monomers. The system includes a fast flow sampling loop, and a control module connected to the fast flow sampling loop. The control module is capable of controlling sample conditioning and measuring a residual concentration of a nitroxide-based polymerization inhibitor in the vinyl-based monomers substantially in real time.

[0007] The foregoing has outlined rather broadly the features and technical advantages of the present ~~invention~~ disclosure in order that the detailed description of the ~~invention~~ present disclosure that follows may be better understood. Additional features and advantages of the ~~invention~~ present disclosure will be described hereinafter that form the subject of the claims of the ~~invention~~present disclosure. It should be appreciated by those skilled in the art that the conception and the specific embodiments disclosed may be readily utilized as a basis for modifying or designing other embodiments for carrying out the same purposes of the present ~~invention~~disclosure. It should also be realized by those skilled in the art that such equivalent embodiments do not depart from the spirit and scope of the ~~invention~~ present disclosure as set forth in the appended claims.