

A Novel Acyclic Nitroxide Designed for Use in Nitroxide-Mediated Miniemulsion Polymerization

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Abstract

Successful control of heterogeneous polymerization in aqueous media, especially in miniemulsion, has been of increasing interest. Nitroxide-mediated polymerization in miniemulsion has featured prominently and the present work builds upon previous research into developing oil-soluble nitroxides with the aim of ensuring efficient initiation and avoiding partitioning of the nitroxide between the water and organic phases. 2,2,5-trimethyl-4-phenyl-3-azahexane-3-nitroxide (TIPNO) is one of the most promising α -H-bearing nitroxides and has been used as a skeleton to synthesize new hydrophobic nitroxides. This paper will describe synthesis of a new alkoxyamine, 2,2,5-Trimethyl-3-(1-phenylethoxy)-4-*tert*-butyl-3-azahexane (Styryl-TITNO), based on the TIPNO skeleton. Styryl-TITNO has been shown to be effective in controlling radical polymerization at temperatures below 100 °C, making it suitable for effecting miniemulsion polymerization at atmospheric pressure. Studies of the efficiency of Styryl-TITNO nitroxide-mediated solution and miniemulsion polymerization of styrene and n-butyl acrylate at 90 °C will be reported.