

Thesis Title	Preparation of block copolymers based on Isoprene, Methyl methacrylate and Styrene via a living free radical polymerization through the use of an iniferter.
Thesis Credits	15
Candidate	Mr. Arun Kongkaew
Supervisors	Dr. Jatuporn Wootthikanokkhan Asst. Prof. Dr. Narongrit Sombatsompop
Degree of Study	Master of Engineer
Department	Materials Technology
Academic Year	1999

### Abstract

This work is a study of the polymerization of isoprene, methyl methacrylate and styrene through the use of benzyl N, N-diethyldithiocarbamate (BDC) as an iniferter. It was found that percentage yield, molecular weight and polydispersity of the polymers increased with time and monomer concentration. The percentage yield of PI and PMMA increased initially and decreased after a critical BDC concentration, the increase in percent being non-linear. The percentage yield of PS increased linearly with the BDC concentration. The molecular weight and polydispersity of the polymers decreased when the BDC concentration was increased.

The synthesized polyisoprene consisted of 1, 4 isomer (90 %) ( $^1\text{H-NMR}$ ), mainly trans 1, 4 isomer ( $^{13}\text{C-NMR}$ ). The glass transition temperature ( $T_g$ ) of synthesized PI was  $-54^\circ\text{C}$ . The polydispersity ranged between 1.8 - 4.5. The  $T_g$  value of synthesized PMMA was  $76.4^\circ\text{C}$  and the polydispersity ranged between 1.8 - 3.0. The  $T_g$  value of synthesized PS was  $57.6^\circ\text{C}$  and the polydispersity ranged between 2.0 - 3.0. The synthesis of block copolymers PI-b-PMMA and PI-b-PS by using PI-macroiniferter was better than using PMMA- macroiniferter and PS- macroiniferter.

**Keywords :** Block copolymers / Living free radical / Iniferters / Macroiniferter /

Benzyl N, N – diethyldithiocarbamate.