Characterization of hydrogenated natural rubber synthesized by diimide transfer hydrogenation

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Abstrak

Oxidation resistance and thermal stability of natural rubber (NR) can be improved by diimide transfer hydrogenation in the latex phase. In this research, non-catalytic diimide transfer hydrogenation of concentrated NR latex was accomplished at various proportions of hydrazine hydrate/hydrogen peroxide. The system was stabilized with the addition of sodium hydroxide. Hydrogenated natural rubber (HNR) was characterized by Fourier Transform Infra Red analysis and degree of hydrogenation. The possibility of side reactions during hydrogenation was also studied by analyzing the gel content and particle size distribution of HNR. It is known that the highest degree of hydrogenation is obtained from the addition of 2 phr hydrazine hydrate and 3 phr hydrogen peroxide at 70oC for a 5-hour diimide transfer hydrogenation of concentrated natural rubber latex, preserved with 1 phr of sodium hydroxide. The higher concentration of hydrogen peroxide trigger crosslink reaction of non-rubber constituent, and depolymerization of HNR molecular chains, were shown by the increased gel content and reduction of HNR particle size distribution, respectively.