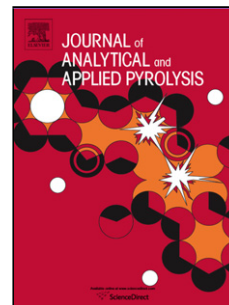


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Study on molecular structure and property of highly purified natural rubber

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Highlights:

- For the first time the molecular structure of highly purified natural rubber(NR) was studied using pyrolysis gas chromatography-mass spectrometry, and they were compared with that of the original NR coagulated by formic acid.
- The purity of highly purified NR was determined by infrared spectroscopy and chemical methods. The results showed it was 97.55%, which was verified by infrared spectroscopy.
- The molecular structure of highly purified natural rubber is more simple than that of the control sample, and the pyrolysis productions of highly purified natural rubber at 550°C are less than that of the control sample. There are 11 types of pyrolysis productions in highly purified natural rubber. limonene、4-ethenyl-1,4-dimethyl-cyclohexene、1,3-pentadiene are main productions that is 58.98% of the mass fraction of total pyrolysis productions in highly purified natural rubber.
- Curing time t_{90} of highly purified natural rubber prolongs, crosslinking density and tensile strength decrease, elongation at break increases and anti-aging performance significantly decreases comparing to natural rubber. Glass Transition Temperature T_g of vulcanizate of highly purified natural rubber is lower than that of the control sample. The S' response from the strain sweep of raw highly purified natural rubber shows significantly different from that of the control sample in the range of large strain.

Abstract

The molecular structure, mechanical property and dynamic mechanics performance of highly purified natural rubber (highly purified NR) were studied. The FTIR results showed that there was no stretching vibration absorption peak of N-H group on 3280 cm^{-1} and vibration compound peak of C-N group and N-H group in amide group on 1540 cm^{-1} in highly purified NR compared to

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