

STUDY OF THE PREPARATION OF LIQUID NATURAL
RUBBER AND ITS CHEMICAL MODIFICATION

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
(PHYSICAL CHEMISTRY)

IN THE
FACULTY OF GRADUATE STUDIES
OF
MAHIDOL UNIVERSITY

1983

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ABSTRACT

Liquid natural rubber (LNR) was prepared from fresh natural rubber latex by thermal oxidative degradation using phenylhydrazine/air system as initiator and the reaction temperature of 70°C. The molecular weights (MW) of LNR between 3,000 - 20,000 could be obtained by varying the reaction time and the amount of phenylhydrazine between 5 - 30 % by weight of the rubber. Increasing the concentration of phenylhydrazine caused greater decrease in the MW for a fixed rate of air flow at a given reaction time. Metal ions used in the form of simple salts did not show catalytic effect. On the contrary, they exhibited retarding effect such that the MW of LNR showed tendency to increase at prolonged reaction time up to 60 hours. Removal of nonrubber contents of the latex, on the other hand, resulted in significant lowering of MW attainable.

The viscosity of LNR prepared showed large increase with storage time from 230 poises to 460 poises but the extent of viscosity increase could be significantly reduced if nonrubber materials were absent. The increase in viscosity was thought to be due to " storage hardening " reactions commonly found in solid natural rubber and also crosslinking caused by residual free radicals or free radical generators present on the rubber molecules.

Modification of phenylhydrazone end group on the rubber molecules to carboxyl group was attempted by oxidation reaction using sodium hypobromite under alkaline condition. Although this conversion could be effected for the model compound benzaldehyde phenylhydrazone, it remained unclear whether the conversion actually took place in the LNR prepared.

