Thesis Title A Study to Characterize Surface Structure of Uncrosslinked Rubber Particles in Natural Rubber Latex by Phase Transfer Technique

Name Sathaporn Kuhakarn

Degree Master of Science (Polymer Science)

Thesis Supervisory Committee

Pramuan Tangboriboonrat, Ph.D.

Krisda Suchiva, Ph.D.

Sauvarop Bualek, Dr. rer. nat

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ABSTRACT

Phase transfer technique was used to characterize the surface structure of uncrosslinked natural rubber (NR) latex. This technique involves the titration of the negatively charged NR particles, derived from protein-lipid complex, with an aqueous solution of cationic surfactant in the presence of non-water miscible organic solvent. At the end point (critical transfer concentration: CTC), the latex particles were transferred from aqueous phase into organic phase and the clear aqueous phase was observed.

After complete transfer, 3 phases were noted, i.e. the upper organic phase containing soluble rubber, having molecular weight about $8x10^{-5}$, the destabilized and suspended rubber at interphase between toluene and water resulted from denatured proteins linked with rubber chains and the lower rubber-free aqueous phase. The organic solvent exhibited a direct influence on the CTC value, whereby this value

increased with the extension of polymer chain in "good" solvent. Results indicated a complete phase transfer process in which 96% of rubber was transferred.

The phase transfer technique, using benzyldimethylhexadecyl-ammonium chloride as a titrant and toluene as a solvent, was employed for the characterization of natural rubber latex purified by deproteinization and multicentrifugation methods. The CTC values showed that all proteins bound to natural rubber particles were not removed by the deproteinization. The remaining proteins linked with rubber chains were denatured and promoted the apparently formation of the destabilized and suspended rubber at the interphase toluene/water after phase transfer. Nitrogen content related to proteins level in purified latex was also studied and results from which confirmed that the phase transfer technique could be used to determine the surface charge of latex particles.

The extension of phase transfer technique for separation of NR and synthetic polystyrene (PS) latex was attempted and preliminary study showed that a lot of works remained to be done.