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CHUTAMAST LERTHITITRAKUL: A STUDY OF MORPHOLOGY OF
VULCANIZED NATURAL RUBBER PARTICLES BY USING PHASE
TRANSFER/ BULK POLYMERIZATION/ TRANSMISSION ELECTRON
MICROSCOPIC (TEM) TECHNIQUE. THESIS ADVISORS: PRAMUAN
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Phase transfer/ bulk polymerization/ TEM technique was used to provide direct evidence of the morphology of latex particles vulcanized by sulphur and peroxide systems. Firstly, the crosslinked latex was characterized mainly by measuring the swelling ratio of sheet. The maturation stage in sulphur prevulcanization caused an increase in crosslink reaction in the initial step but it did not affect the crosslink density of final prevulcanized latex sheet. When comparing latex with different nitrogen content, it was found that protein in NR latex could accelerate the sulphur vulcanization reaction. Addition of sodium dodecyl sulfate did not influence the sulphur- and peroxide-prevulcanization reactions even though it caused the increment of the amount of negative charge on NR particle. Multicentrifuged, "residue-free-sulphur-prevulcanized" latex was also prepared. Only a small amount of the residual chemicals in the serum was detected. When the morphology of peroxide-prevulcanized latex particles was studied by using SEM, the micrographs of fractured latex sheet showed the discrete crosslinked rubber particles and the clear membrane around them. Conversely, SEM of fractured prevulcanized and residue-free-sulphur-prevulcanized latex sheets revealed indistinct appearance of rubber particle boundary. Under TEM, semi-IPNs type Semi-I of network structure of NR chains in rubber particle containing PS was observed in both types of all crosslinked particles. Moreover, inhomogeneous network structure inside each particle was observed in peroxide-prevulcanizate while the rubber network in sulphur-prevulcanized and γ -radiation-vulcanized NR particles was uniform.