

Ladawan Songtipya 2010: Preparation of Graft Copolymer of Natural Rubber and Polystyrene by Gamma Radiation. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging Technology and Materials. Thesis Advisor: Miss Tarinee Nampitch, D.Eng. 120 pages.

Gamma ray is high energy radioactivity, which can synthesis the natural rubber grafted styrene (NR-g-PS) and vulcanized in the phase of natural rubber, in the same time. Importance factors for graft-copolymerized reaction were quantity of sensitizer (*n*-BA) and radiation dose. Preparation of graft copolymer by using *n*-BA at 5 phr and radiation dose 20 kGy will be optimal condition for production because this condition will get the good properties and the natural rubber compound was without the coagulation. The chemical structure of grafted styrene on natural rubber particle was characterized by FT-IR and <sup>1</sup>H-NMR. Results indicated that polystyrene peaks were observed. The modulus, tensile strength, hardness and particle size of NR-g-PS increase with increasing proportion of styrene in the graft-copolymer, while grafting efficiency and elongation at break decrease. The graft-copolymer containing 30% by weight of styrene monomer showed maximum tensile strength and it can improve the hardness of natural rubber more than 2 time. Preliminary production of shock migration foam by using NR-g-PS was studied. It was found that NR-g-PS may be used as hardness modifier for shock migration foam to substitute other reinforcing fillers, such as calcium carbonate and clay.

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