

Kritsana Potsatian 2006: Mechanical Properties of Polystyrene-Natural Rubber
Copolymer Plastic. Master of Engineering (Chemical Engineering), Major Field:
Chemical Engineering, Department of Chemical Engineering. Thesis Advisor:
Assistant Professor Terdthai Vatanatham, Ph.D 92 pages.
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This study is a part of work to improve the impact strength of polystyrene by adding natural rubber latex into polymerizing emulsion of styrene. The natural rubber, which replaces polybutadiene, can be used as impact modifier. The mechanical properties of polystyrene-natural rubber are reported at various content of natural rubber latex from 3 to 9 parts of organic material of the emulsion polymerization recipe. From tensile test, ultimate tensile strength decreases from 36.564 to 14.318 MPa and Young's modulus decreases from 2.314 to 0.848 GPa but elongation at break increases from 1.227 to 37.297. From Izod impact test, the notched Izod impact strength increases from 14.5 to 85.4 J/m. The impact resistance of plastic film of polystyrene-natural rubber copolymer with 9% natural rubber is 0.946 J. From thermal properties test, melting point and heat of fusion of polystyrene-natural rubber copolymers decrease as the rubber content increases from 246.7 to 241.2 °C and from 3,954 to 3,622 kJ/kg respectively. Polystyrene-natural rubber copolymers sorted according to impact strength can be in the medium impact polystyrene class. Even though the impact strength of polystyrene can be improved by natural rubber, all specimens that were molded by compression molding or solution casting under heat or high temperature were off-color. They changed from white to brown or dark brown, due to heat effect on natural rubber. The natural rubber may be heat degraded under high temperature consequently the impact strength of copolymer is not much.

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