

Sopit Chuypun 2010: Effect of Plasticized Poly(vinyl chloride) on Properties of Natural Rubber and Nitrile Rubber. Master of Engineering (Materials Engineering), Major Field: Materials Engineering, Department of Materials Engineering. Thesis Advisor: Mr. Somjate Patcharaphun, Dr.-Ing. 127 pages.

In this study, the discarded plasticized poly(vinyl chloride) (pPVC) from extrusion of weather-seal was powderised and used as a filler for Natural Rubber (NR) and Nitrile Rubber (NBR). The effects of pPVC content on the rheological, mechanical and physical properties of rubber were studied in details. The rubber compounds and vulcanizates were characterized with respect to mooney viscosity, cure characteristic, tensile strength, hardness, compression set, abrasion, oil, and flame resistance, respectively. The effects of adding compatibilizer and coupling agent were also investigated. The results obtained from rheological tests indicated that the mooney viscosity of NR and NBR increased with the increasing amount of pPVC added. It was also found that the cure characteristic of NBR increased while the cure time of NR decreased as the increasing pPVC content. Considering the mechanical and physical properties of NR and NBR containing various pPVC contents, it was observed that the adding of pPVC improved the hardness and oil resistance of NR and NBR, including the tensile strength of NBR and flame resistance of NR, respectively. In addition to the thermal and ultraviolet resistance, it was found that the mechanical properties of unfilled NR and NBR decreased due to the desulphurization of the sulphur crosslinks and chain scission during heat and ultraviolet aging. It should be noted that the mechanical properties of the NR and NBR containing varying amount of pPVC were higher than that of unfilled NR and NBR. This was probably associated with the escape and/or degradation of plasticizer and the PVC gelation phenomenon during aging tests. Furthermore, the experimental results obtained from NR+pPVC30 filled with various content of ENR, CR, and MAH showed that the adding of ENR, CR, and MAH could improve the compatibility between NR and pPVC which led to an increase of abrasion, oil, flame, thermal, and ultraviolet resistances.

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Thesis Advisor's signature