Blends of nitrile butadiene rubber/poly (vinyl chloride): The use of maleated anhydride castor oil based plasticizer

Indiah Ratna Dewi, author

Abstrak

Recently, much attention has been focused on research to replace petroleum-based plasticizers, with biodegradable materials, such as biopolymer which offers competitive mechanical properties. In this study, castor oil was modified with maleic anhydride (MAH) to produce bioplasticizer named maleated anhydride castor oil (MACO), and used in nitrile butadiene rubber (NBR)/poly vinyl chloride (PVC) blend. The effect of MACO on its cure characteristics and mechanical properties of NBR/PVC blend has been determined. The reactions were carried out at different castor oil (CO)/xylene ratios, i.e. 1:0 and 1:1 by weight, and fixed CO/MAH ratio, 1:3 by mole. DOP, CO, and MACO were added into each NBR/PVC blend according to the formula.

It was found that the viscosity and safe process level of NBR/PVC blend is similar from all plasticizer, however, MACO (1:0) showed the highest cure rate index (CRI). MACO-based plasticizer gave a higher value of the mechanical properties of the NBR/PVC blend as compared to DOP based plasticizer. MACO (1:1) based plasticizer showed a rather significance performance compared to another type of plasticizers both before and after aging. The value of hardness, elongation at break, tensile strength, and tear strength were 96 Shore A, 155.91 %, 19.15 MPa, and 74.47 MPa, respectively. From this result, NBR/PVC blends based on MACO plasticizer can potentially replace the DOP, and therefore, making the rubber blends eco-friendly.