

Synthesis of 2,4-difenilkarbamidotoluene and its use for modifying the rubber

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Abstract

In the production of all-steel tires main way rubber mounting to metal is vulcanised rubber with brass metal cord. This method provides a high fixing strength rubbers based on isoprene or natural rubber to a metal product obtained good resistance to vibrations and shocks. Brass plating steel cord is a costly step, so a possible solution, which allows to significantly reduce the cost of rubber, steel is the use of steel cord.

The research on the development of adhesion promoters for fixing the rubber to steel metal cord. The adhesion promoters used as blocked isocyanate – 2,4-diphenylcarbamide toluene obtained by reacting 2,4-toluene diisocyanate and aniline. Synthesized 2,4-diphenylcarbamide toluene identified by IR spectroscopy, elemental analysis, melting point. Next, the 2,4-diphenylcarbamide toluene used as a modifier of rubber mixtures based on synthetic isoprene rubber to improve adhesion of rubber to steel cord. 3, the rubber composition of the sample was obtained with different contents of 2,4-diphenylcarbamide toluene (0.08; 0.18; 0.27 wt %) and compared with a rubber compound based on a standard adhesion promoter Manobond-680S. It was found that all the test samples of rubber compounds with 2,4-diphenylcarbamide toluene improve the adhesion of rubber to steel cord in an average of 20% compared to a standard adhesion promoter – Manobond 680S. It is suggested that possible options to strengthen the link rubber – metal cord, which is connected with the fact that in the process of curing, when the decomposition temperature increases can occur up to 150 °C 2,4-diphenylcarbamide toluene in two directions: to produce aniline and isocyanate, which may cause the formation of an additional network of chemical bonds with the metal surface, which leads to increased adhesion.

Thus, the results indicate that the blocked isocyanates, particularly 2,4-diphenylcarbamide toluene, are capable of increasing polymer adhesion to the steel of steel cord. This can simplify manufacturing rubber belt technology, avoiding the stage brass plating steel cord and creates the preconditions for increasing the strength of the bond rubber-steel cord.

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