



Effect of Gamma-Irradiation on the Properties of Tyre Cords

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The industrial cord fabrics are used for reinforcing of tyre carcass. Tyre reinforcing elements carry the major share of the structural load of the automobiles. For the better service life of a tyre, the reinforcing material should exhibit excellent strength properties, fatigue resistance, modulus, cord-tyre adhesion level, and dimensional stability [1]. The tyre cord fabrics can be produced with different type of materials. Yarns offered at the market, are namely, Polyamide 6 and 66, Polyester, Rayon and Aramid.

One of the successful industrial application of radiation processing has been the pre-vulcanization of tyres imparting shapes stability prior to final vulcanization[2]. Since tyre is a composite of reinforcing materials and rubber compounds, the influence of high energy irradiation on the reinforcing materials, i.e. on the textile cord needs to be investigated.

In this study, gamma irradiation of high tenacity nylon 66 and polyester tyre cords was investigated. The untreated tyre cords with different twist levels were irradiated in air. The changes in the mechanical and thermal properties with absorbed dose were measured. The mechanical properties were deteriorated with increasing dose for nylon 66 cords, while almost unchanged for polyester cords. Hot shrinkage for the nylon cords was found to be improved, i.e. decreased. A slight decrease in the hot shrinkage of irradiated polyester cords was also observed. It has been found that the effect of irradiation on both nylon 66 and polyester cords was not dependent on the twist levels of the cords. It is also concluded that polyester cord has higher radiation resistance than nylon 66 cord, and polyester cord seems to be more suitable reinforcing material for pre-vulcanization of tyres with high energy radiation.

[1] A.K. Naskar, A.K. Mukherjee, R. Mukhopadhyay, Polym Deg. Stability, 83 (2004) 173

[2] K.S.S. Sarma, IANCAS Bulletin, 4 (2005) 128.