

# CHARACTERIZATION AND FORMULATION DEVELOPMENT OF NOVEL TYRE DE-VULCANIZATE

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## ABSTRACT

There are two major obstacles when dealing with used tyres. First, how to degrade a material considered to be non-biodegradable; and secondly, what can be done with the degraded material. This study attempts to deal with the second problem.

To determine the quality of recycled rubber it is important to look at physical attributes such as processing and tensile properties. Unfortunately some inherent problems with reclaimed rubber include reduced tensile properties and decreased scorch time, irrespective of the de-vulcanizing method used, although some methods produce slightly better quality than others. These problems are believed to be due to residual accelerators in the reclaimed rubber, lower molecular weight polymers as well as poor dispersion in the virgin rubber matrix [1, 2].

In partnership with local reclaim tyre companies, this study looks at the chemical composition of a general tyre tread formula as well as reclaimed rubber from used car tyres. In order to characterize the chemical composition and physical properties TGA, GPC, tensometer and rheometer methods were used. By comparing the chemical composition of both the formula and the reclaimed rubber a formulation was devised which aimed at increasing the quantity of reclaimed rubber used in standard tyre tread formulas to greater than 10%, which is the current maximum.

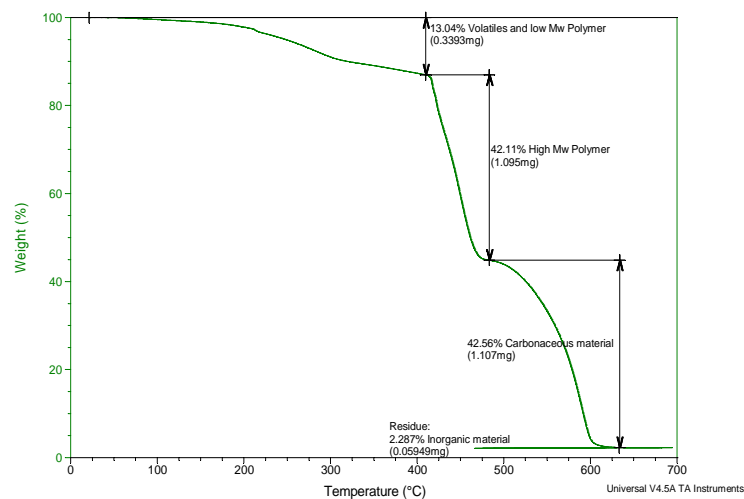


Figure 1: TGA analysis of rubber crumb

## References:

1. Saiwari, S., *PhD Thesis: Post-consumer tires back into new tires: De-vulcanization and re-utilization of passenger car tires*. 2013, Enschede, Netherlands: Technical University of Twente.
2. S. De, A.I., K. Khait, *Rubber Recycling*. 2005: CRC Press.