

VULCANIZATES OF SBR FILLED WITH MODYFIED GROUND TYRE RUBBER

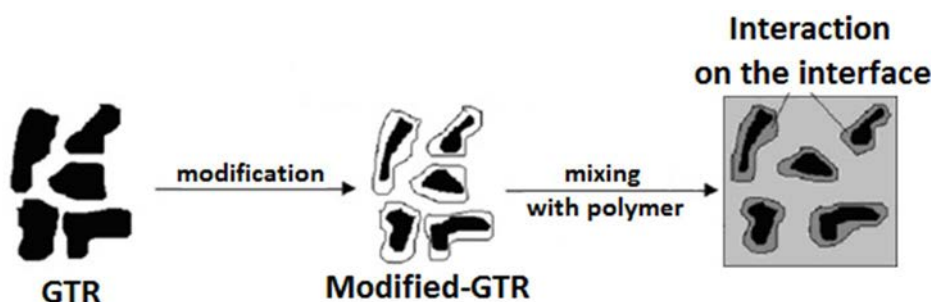
Katarzyna Klajn¹, Tomasz Gozdek², Mariusz Siciński², Dariusz M. Bieliński²

¹ ACS Rubber Division Student Chapter, Institute of Polymer and Dye Technology, Faculty of Chemistry, Lodz University of Technology Stefanowskiego 12/16 Street, 90-924 Łódź, Poland
katarzyna_klajn@interia.pl

² Institute of Polymer and Dye Technology, Faculty of Chemistry, Lodz University of Technology, Stefanowskiego 12/16 Street, 90-924 Łódź, Poland

Constant development of car industry is a reason of the increase in amount of waste from end – of - life vehicles and their components. Each car has about 60 kg of rubber elements, from which 2/3 are tyres [1]. Recycling of this type of waste is problematic due to the complex compositions of products and many types of them. However, there are many ways to reuse worn car tyres, such as retreading, burning in order to produce energy or granulated.

In polymer technology there can be used the product of car tyres grinding, with size of particles is lower than 1 mm - Ground Tire Rubber (GTR). GTR may be used in rubber compounds as a filler which function is to replace more expensive standard filler like carbon black or silica. In published studies [2, 3] it is showed that addition below 30 phr can be accepted in some applications. Despite of this, a problem with the interaction between ground tyre rubber and the polymer matrix occurs. Modification of GTR's surface helps to improve compatibility of GTR with polymer matrix (Fig.).



Scheme representing compatibilization of GTR with polymer matrix [4].

This study includes results of chemical modifications of GTR with the use of sulphuric acid and silanes such as (3-mercaptopropyl)trimethoxysilane. The effect of modifications was investigated by analyzing of composition, surface free energy analysis and shape of ground tyre rubber particles. This tests show crucial changes in the surface of GTR after modifications. What is more the vulcanizates with modified GTR were prepared and in order to their mechanical properties and crosslinking density were examination.

References:

- [1] Wojciechowski A., Żmuda W., Doliński A.: *Logistyka*, 2014, 6, 11278-11288
- [2] Carli L. N., Boniatti R., Teixeira C. E., Nunes R. C. S., Crespo J. S.: *Mater. Sci. Eng., C*, 2009, 29, 383–386
- [3] Yehia A. A., Mull M. A., Ismail M. N., Hefny Y. A., Abdel- Bary E. M.: *J. Appl. Polym. Sci.*, 2004, 93, 30-36.
- [4] Zhang X., Lu C., Liang M.: *J. Polymer Res.* 2009, 16, 411.