WEAR STUDY OF TIRE TREAD MATERIALS UNDER LOW-SEVERITY WEAR CONDITIONS

***Cloé Chanal [a,b*], Benoit Moreaux [c], Jean-Luc Loubet [b], Paul Sotta [a]**
*cloe.chanal@insa-lyon.fr
[a] Ingénierie des Matériaux Polymères, Université de Lyon, CNRS, UMR 5223, INSA Lyon
17 avenue Jean Capelle, 69621 Villeurbanne, France
[b] Laboratoire de Tribologie et Dynamique des Systèmes, CNRS/École Centrale de Lyon UMR 5513
36 avenue Guy de Collongue, 69134 Écully, France
[c] Solvay Silica
15 rue Pierre Pays, 69660 Collonges au Mont d'Or, France

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ABSTRACT
Nowadays, tire wear debris are considered a major contributor of microplastic pollution to the environment, which is a major public health concern [1]. Therefore, enhancing the comprehension of abrasion wear for tire tread materials to improve wear resistance is a key challenge. However, tire manufacturers are facing phenomenal costs to perform in-field wear tests of tire treads, which are also time consuming. Besides, in-field wear processes are very complex, and many factors can have a large impact on results like the type of road, climate conditions and driving. Therefore, developing a reliable accelerated laboratory test in controlled model conditions is a key alternative to facilitate experiments and the choice of materials.

The general concept of wear test is to apply a normal load together with slip between the material of interest and an abrading surface. Wear is induced by interfacial friction. The wear rate of the material can be described by the weight or volume loss per unit sliding length or per unit frictional dissipated energy.

In this work, an original dynamic tribometer is used to simulate low-severity wear conditions on rubber tire materials (Fig.1). It allows performing quantitative and accelerated wear tests which mimic real usage conditions in terms of kinematics and dynamics of the contact [2]. Silica-filled Styrene Butadiene Rubber (SBR) and cis-Butadiene Rubber (BR) blend materials, usually used for passenger vehicles were tested. Throughout the test, the wear rate is quantified, and wear patterns are analyzed for various test and material parameters, to finally allow a better understanding of the wear phenomena of reinforced elastomers used in tire treads.

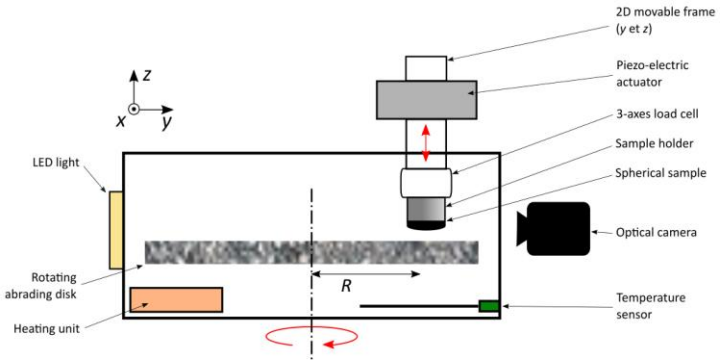

Fig.1 *Rotary tribometer diagram*

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