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ENVIRONMENT AND RECYCLING: A STRATEGIC CHALLENGE FOR RUBBER MATERIALS

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INFLUENCE OF NETWORK STRUCTURE IN RUBBER ELASTICITY

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Abstract:

Elasticity in rubber materials depend on molecular parameters that define the network structure. Crosslinks and entanglements have an effect that is already taken into account in different ways in the diverse rubber elasticity theories. Different experimental approaches to characterize those parameters are mechanical properties tests, swelling experiments and more recently double quantum nuclear magnetic resonance (DQ-NMR). The analysis of those experiments is based on different assumptions and theoretical approaches, reducing the consistence of the so-obtained results.

The main purpose of this work is to unify for the first time those approaches in order to work under just one theoretical framework as independent as possible from the experiments. This will lead us to a new methodology of analysis that allows to combine those experimental techniques for a better quantification of structural parameters as crosslink and entanglement density. Moreover, it could set the effect of other important parameters as network defects and space distribution of crosslinks (not taken into account in the rubber elasticity theories) in the properties of rubber materials.