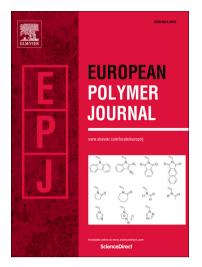
Accepted Manuscript

Dynamic crosslinking of silicone elastomer: Radical branching controlled by thermo-oxidation under shearing

T. Métivier, E. Beyou, P. Cassagnau

PII:	S0014-3057(17)32068-2
DOI:	https://doi.org/10.1016/j.eurpolymj.2018.02.008
Reference:	EPJ 8282
To appear in:	European Polymer Journal
Received Date:	18 November 2017
Revised Date:	17 January 2018
Accepted Date:	5 February 2018



Please cite this article as: Métivier, T., Beyou, E., Cassagnau, P., Dynamic crosslinking of silicone elastomer: Radical branching controlled by thermo-oxidation under shearing, *European Polymer Journal* (2018), doi: https://doi.org/10.1016/j.eurpolymj.2018.02.008

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Dynamic crosslinking of silicone elastomer: Radical branching controlled by thermo-oxidation under shearing

T. Métivier, E. Beyou, P. Cassagnau^{*}

Univ Lyon, University of Lyon 1, Ingénierie des Matériaux Polymères, CNRS UMR 5223, 15 Bd Latarjet, 69622 Villeurbanne, France

* philippe.cassagnau@univ-lyon1.fr

ABSTRACT: Methylvinyldimethylsiloxane copolymer elastomer was crosslinked under static and dynamic conditions with several amounts of peroxide. For samples crosslinked in static conditions, the insoluble fractions and the shear equilibrium moduli have been observed in a good agreement with theories of network elasticity. As regards the dynamically crosslinked samples, the rheological and SEC analysis have revealed that the crosslinking reaction gives rise to multi-scale branched structures with molecular structures achieving 10⁷ g/mol and proved that these samples remain soluble and processable. Moreover, dynamic crosslinked samples also show a strain hardening behavior even in bi-elongational flows. Furthermore, experiments under nitrogen and air atmospheres were carried out to better understand the mechanisms of the formation of these branched structures. The results suggest that molecular oxygen lowers the consumption of vinyl groups inhibiting the crosslinking reaction. Finally, the rheological behavior may be explained by the original microstructure composed of un-crosslinked chains playing the role of the matrix while the miscible and branched structures of macromolecules act as reinforcement agent.

Keywords: Silicone, rheology, radical crosslinking, thermo-oxidation, dynamic crosslinking.

Download English Version:

https://daneshyari.com/en/article/7803828

Download Persian Version:

https://daneshyari.com/article/7803828

Daneshyari.com