Accepted Manuscript

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PII: S0141-3910(18)30211-8

DOI: 10.1016/j.polymdegradstab.2018.06.019

Reference: PDST 8584

To appear in: *Polymer Degradation and Stability*

Received Date: 27 August 2017

Revised Date: 28 June 2018

Accepted Date: 29 June 2018

Please cite this article as: Berto P, Grelier Sté, Peruch Fréé, Controlled degradation of polyisoprene and polybutadiene: A comparative study of two methods, *Polymer Degradation and Stability* (2018), doi: 10.1016/j.polymdegradstab.2018.06.019.

Controlled degradation of polyisoprene and polybutadiene: a comparative study of two methods

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Keywords:

Polybutadiene, Polyisoprene, controlled degradation, epoxidation, periodic acid, mCPBA

Abstract:

Low molar mass carbonyl telechelic cis,1-4 polyisoprene (CTPI) and aldehyde telechelic cis,1-4 polybutadiene (ATPB) were easily prepared by the controlled degradation of high molar mass 1,4-*cis* polyisoprene (PI) and 1,4-*cis* polybutadiene (PB) in a molar mass range of 5 000 – 80 000 $g.mol^{-1}$. Two methods are compared: the direct one using only the periodic acid (H_5IO_6) to randomly cleave the chain and a second one where the chain are first epoxidized before being cleaved by the periodic acid. In both cases, a control of the final chain length was observed with nevertheless a better control of the final chain length, dispersity and chain-ends using the 2-steps procedure. Importance of the washing step in order to avoid side reactions on the carbonyl chain-ends is also discussed.