Accepted Manuscript

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PII: S0141-3910(17)30003-4

DOI: 10.1016/j.polymdegradstab.2017.01.003

Reference: PDST 8142

To appear in: *Polymer Degradation and Stability*

Received Date: 27 November 2016

Revised Date: 26 December 2016

Accepted Date: 6 January 2017

Please cite this article as: Tachibana Y, Baba T, Kasuya K-i, Environmental biodegradation control of polymers by cleavage of disulfide bonds, *Polymer Degradation and Stability* (2017), doi: 10.1016/j.polymdegradstab.2017.01.003.

Original research paper

Environmental Biodegradation Control of Polymers by Cleavage of Disulfide Bonds

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ABSTRACT

Ideal biodegradable polymers have high durability during use and high degradability in the natural environment it enters after use. A trigger system that uses external stimuli to change the chemical properties of a polymer or directly degrade the polymer to low molecular weight compounds is suitable for controlling the biodegradability of a polymer. In this study, we adopted the reductive cleavage of disulfide bonds as a trigger to control the biodegradability of polymers. We synthesized polyesters with disulfide bonds and demonstrated that the environmental biodegradability of these polymers could be triggered by cleavage of the disulfide bonds in a reductive environment.

Keywords: Biodegradable polymer; Disulfide bond; Reductive cleavage; Environmental biodegradability