

Accepted Manuscript

Title: Protected Thiol Strategies in Macromolecular Design

Author: Fabienne Goethals Daniel Frank Filip E. Du Prez

PII: S0079-6700(16)30066-1

DOI: <http://dx.doi.org/doi:10.1016/j.progpolymsci.2016.09.003>

Reference: JPPS 994

To appear in: *Progress in Polymer Science*

Received date: 9-5-2016

Revised date: 29-8-2016

Accepted date: 1-9-2016



Please cite this article as: Goethals F, Frank D, Prez FED, Protected Thiol Strategies in Macromolecular Design, *Progress in Polymer Science* (2016), <http://dx.doi.org/10.1016/j.progpolymsci.2016.09.003>

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.

Protected Thiol Strategies in Macromolecular Design

Fabienne Goethals, Daniel Frank, Filip E. Du Prez*filip.duprez@ugent.be

Polymer Chemistry Research Group, Department of Organic and Macromolecular Chemistry,
Ghent University, Krijgslaan 281 S4, B-9000 Gent, Belgium.

Abstract

Reactions involving thiols have been extensively applied in numerous polymeric systems thanks to the reactive nature of the mercapto group, causing these reactions to be efficient and high-yielding. The amount of publications and reviews on the topic of thiol-related reactions in polymer science during the last decade illustrates the rising importance of nucleophilic and radical thiol-ene, thiol-yne and other thiol-X chemistries. In view of orthogonality conflicts and considering their instability towards oxidation and incompatibility with many polymerization processes, several strategies to protect thiols and thus prevent unwanted reactions have been developed and optimized. Generally, a distinction can be made based on the release of byproducts (atom efficiency) of the reactions as well as on the mechanism triggering the thiol release. This review aims to provide an overview of the advances in the use of protected thiols for macromolecular synthesis, with applications in polymerization or post-polymerization modification reactions, but also for the design of more complex structures. In all cases, it is essential that processes must not interfere with the latent thiol function until release is required.

Keywords

Thiol-X chemistry, Thiol protection strategy, Disulfide, Polymer functionalization, Thiolactone, Click chemistry

Abbreviations

AcSEMA 2-(acetylthio)ethyl methacrylate; AIBN azobisisobutyronitrile; ATRP: atom-transfer radical polymerization; BSA: bovine serum albumin; CANs: covalent adaptable networks; CuAAC: Cu(I)-catalyzed azide-alkyne cycloaddition; CRP: controlled radical polymerization; CTA: chain transfer agent; DMA: N,N-dimethylacrylamide; DMPA: 2,2-dimethoxy-2-phenylacetophenone; DTT: dithiothreitol; LCST: lower critical solution temperature; MA: methacrylate; MMA: methyl methacrylate; MEO₂MA: 2-(2-methoxyethoxy)ethyl methacrylate; Na-

Download English Version:

<https://daneshyari.com/en/article/5207925>

Download Persian Version:

<https://daneshyari.com/article/5207925>

[Daneshyari.com](https://daneshyari.com)