

## Accepted Manuscript

Systematic optimization of poly(vinyl chloride) surface modification with an aromatic thiol

Colin P. McCoy, Nicola J. Irwin, John G. Hardy, Susan J. Kennedy, Louise Donnelly, John F. Cowley, Gavin P. Andrews, Sreekanth Pentlavalli

PII: S0014-3057(17)30081-2

DOI: <https://doi.org/10.1016/j.eurpolymj.2017.09.030>

Reference: EPJ 8081

To appear in: *European Polymer Journal*

Received Date: 17 January 2017

Revised Date: 30 August 2017

Accepted Date: 20 September 2017

Please cite this article as: McCoy, C.P., Irwin, N.J., Hardy, J.G., Kennedy, S.J., Donnelly, L., Cowley, J.F., Andrews, G.P., Pentlavalli, S., Systematic optimization of poly(vinyl chloride) surface modification with an aromatic thiol, *European Polymer Journal* (2017), doi: <https://doi.org/10.1016/j.eurpolymj.2017.09.030>

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.



**Systematic optimization of poly(vinyl chloride) surface modification with an aromatic thiol**

Colin P. McCoy\*, Nicola J. Irwin, John G. Hardy<sup>a</sup>, Susan J. Kennedy, Louise Donnelly, John F. Cowley, Gavin P. Andrews, Sreekanth Pentlavalli

School of Pharmacy, Queen's University Belfast, Belfast BT9 7BL, UK

<sup>a</sup>Department of Chemistry, Lancaster University, Lancaster, Lancashire, UK

\*Corresponding author

Tel: +44 (0) 2890972081; Fax: +44 (0) 2890247794; Email:c.mccoy@qub.ac.uk

**Abstract**

The efficient covalent functionalization of poly(vinyl chloride) (PVC), which is widely used in medical device manufacture, allows an array of potential property-enhancing surface modifications to be made. To demonstrate a general method of functionalization *via* substituted (functional) thiols, we describe a systematic approach to the optimization of PVC surface modification by nucleophilic substitution with 4-aminothiophenol through control of reaction conditions: solvent composition, sonication, reaction time and presence of base and/or phase transfer catalyst (PTC). Efficient thiol attachment was confirmed using solid-state NMR and Raman spectroscopies, and the extent of surface modification was quantified using ATR-FTIR spectroscopy. Sonicated samples exhibited a lower degree of modification than their statically immersed counterparts (21.7 vs 99.6  $\mu\text{g cm}^{-3}$ ), and mechanical integrity was compromised. In DMSO/H<sub>2</sub>O systems with a PTC, resultant degrees of PVC surface modification were up to 12.5% higher when caesium carbonate was employed as the base than in corresponding systems with potassium carbonate.

**Keywords**

PVC, thiol, nucleophilic substitution, surface modification

Download English Version:

<https://daneshyari.com/en/article/5159106>

Download Persian Version:

<https://daneshyari.com/article/5159106>

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