

Self-replenishing low-adherence coatings

Citation for published version (APA):

Dikic, T., Ming, W., Benthem, van, R. A. T. M., & With, de, G. (2007). Self-replenishing low-adherence coatings. In A. J. M. Schmets, & S. Zwaag, van der (Eds.), *Proceedings of the 1st International Conference on Self Healing Materials, 18-20 April 2007, Noordwijk, The Netherlands* Springer.

Document status and date:

Published: 01/01/2007

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.tue.nl/taverne

Take down policy

If you believe that this document breaches copyright please contact us at:

openaccess@tue.nl

providing details and we will investigate your claim.

SELF-REPLENISHING LOW-ADHERENCE COATINGS

T. Dikić, W. Ming*, R. van Benthem, G. de With

*Eindhoven University of Technology, Laboratory for Interface and Materials
Chemistry,*

*P. O. Box 513, 5600 MB Eindhoven, The Netherlands; Dutch Polymer
Institute (DPI), P.O. Box 902, 5600 AX Eindhoven, The Netherlands*

E-mail: W.Ming@tue.nl

Low-adherence coatings are widely used today since their water/oil repellency makes them easily cleanable (a well-known example is PTFE). The low surface tension is provided by fluorine- or silicon-containing species that are present at the film surface. Low adherence coatings have already been developed via surface segregation of fluorinated species. However, it has been shown that the fluorine-enriched layer is very thin, and the coating may not sustain low adherence upon mechanical abrasion. An approach to develop self-replenishing low surface energy coatings is to distribute long perfluoroalkyl-end-capped chains relatively homogeneously in a coating network. In case of surface damage that leads to the loss of the top layers of the coating, fluorinated tails from sub-layers will be able to reorient themselves to minimize the air/film interfacial energy. In order to study the self-replenishing behavior, model polyester precursors with controlled functionality were synthesized via controlled ring-opening polymerization of ϵ -caprolactone using perfluoroalkyl alcohol or polyol as initiators. The as-prepared precursors were cured with polyisocyanate crosslinker to obtain films with low surface energy. The fluorine depth profile and the self-replenishing behavior have been investigated. The influence of the mobility of polymer spacer and network, as well as temperature, on the self-replenishing behavior will be discussed.