

Accepted Manuscript

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PII: S0257-8972(17)31072-1
DOI: doi:[10.1016/j.surfcoat.2017.10.039](https://doi.org/10.1016/j.surfcoat.2017.10.039)
Reference: SCT 22804
To appear in: *Surface & Coatings Technology*
Received date: 29 June 2017
Revised date: 10 October 2017
Accepted date: 11 October 2017

Please cite this article as: Hao Zhang, Yibin Liu, Chunping Hou, Yong Ma, Baoliang Zhang, Hepeng Zhang, Qiuyu Zhang , Low-maintenance superamphiphobic coating based on a smart two-layer self-healing network. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2017), doi:[10.1016/j.surfcoat.2017.10.039](https://doi.org/10.1016/j.surfcoat.2017.10.039)

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Low-maintenance superamphiphobic coating based on a smart two-layer self-healing network

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Keywords: superamphiphobic; self-healing; thiol-ene; two-layer network; sol-gel.

Abstract: Superamphiphobic surfaces with a rapid ability to autorepair from multiple damages are desirable for long-lived self-cleaning coatings. Previous studies have almost introduced such a self-healing surface against chemical or physical damage, however, the regeneration is out of work as the stain accumulates over time. Herein, a low-maintenance superamphiphobic coating based on a smart two-layer self-healing network has been presented. The coated fabric can withstand at least 200 cycles of abrasion under a pressure of 45 kPa and strongly resist to UV radiation, boiling treatment, strong acid/base immersion and smudge treatment, without apparently changing the superamphiphobicity. Besides physical and chemical damages, the coating can even rapidly retain its super liquid-repellence against a long-term accumulation of smudge by using a short heating treatment. Such a rapid and multiple self-healing ability resulting from the smart two-layer network may be useful for the development of low-maintenance protective coatings.

1. Introduction

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