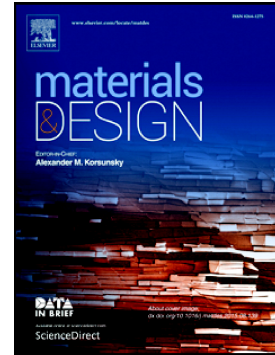


Accepted Manuscript

A strategy for constructing superhydrophobic multilayer coatings with self-cleaning properties and mechanical durability based on the anchoring effect of organopolysilazane

Zhifeng Chen, Guangji Li, Liying Wang, Yinlei Lin, Wei Zhou



PII: S0264-1275(17)31139-5
DOI: <https://doi.org/10.1016/j.matdes.2017.12.034>
Reference: JMADE 3585
To appear in: *Materials & Design*
Received date: 20 September 2017
Revised date: 3 December 2017
Accepted date: 17 December 2017

Please cite this article as: Zhifeng Chen, Guangji Li, Liying Wang, Yinlei Lin, Wei Zhou , A strategy for constructing superhydrophobic multilayer coatings with self-cleaning properties and mechanical durability based on the anchoring effect of organopolysilazane. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Jmade(2017), <https://doi.org/10.1016/j.matdes.2017.12.034>

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.

**A strategy for constructing superhydrophobic multilayer coatings
with self-cleaning properties and mechanical durability based on the
anchoring effect of organopolysilazane**

Zhifeng Chen¹, Guangji Li^{1,*}, Liying Wang¹, Yinlei Lin² and Wei Zhou¹

¹School of Materials Science and Engineering, South China University of Technology, Guangzhou 510640, China

²School of Light Industry and Food Science, South China University of Technology, Guangzhou 510640, China

*Corresponding author: Guangji Li

E-mail address: gjli@scut.edu.cn (G. Li)

ABSTRACT

Artificial superhydrophobic surfaces suffer from poor mechanical durability. Organopolysilazane (OPSZ), which could anchor to most materials, and fluorinated silica nanoparticles (F-SiO₂ NPs) were employed to construct mechanically durable superhydrophobic nanocomposite multilayer coatings. (OPSZ/F-SiO₂)_n ($n = 0.5, 1, 1.5, \dots, 5$) coatings were constructed by alternately spraying OPSZ and F-SiO₂ NPs layer by layer on glass substrates. With the increase in the number of OPSZ/F-SiO₂ bilayers, the surface roughness and hydrophobicity exhibited an overall increasing trend. The coatings with F-SiO₂ NPs on the outside possessed slightly rougher surfaces and stronger hydrophobicity than the corresponding coatings with OPSZ on the outside. The coating containing five bilayers exhibited a microscopic rough surface with hierarchical micro/nanoscale structures and superhydrophobicity, with a water contact angle of 158.3° and a sliding angle of 3°. The coating was translucent and possessed a low water droplet adhesive force (13 μN) and good self-cleaning properties. It possesses excellent mechanical durability and maintains its superhydrophobicity upon being immersed in strong acid and alkali solutions, presenting broad application prospects. This facile yet universal strategy for constructing superhydrophobic coatings offers an effective solution to the poor mechanical durability

Download English Version:

<https://daneshyari.com/en/article/7217391>

Download Persian Version:

<https://daneshyari.com/article/7217391>

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