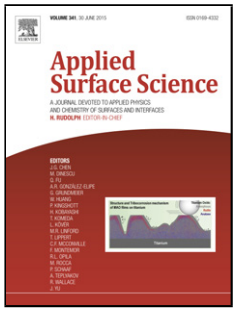

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PII: S0169-4332(17)32751-4
DOI: http://dx.doi.org/10.1016/j.apsusc.2017.09.102
Reference: APSUSC 37181

To appear in: *APSUSC*

Received date: 9-5-2017
Revised date: 11-9-2017
Accepted date: 13-9-2017

Please cite this article as: Julien Marchalot, Stella.M.M.Ramos, Christophe Pirat, Catherine Journet, Enhanced Water Repellency of Surfaces coated with Multiscale Carbon Structures, Applied Surface Sciencehttp://dx.doi.org/10.1016/j.apsusc.2017.09.102

Article type: Short Communication

Enhanced Water Repellency of Surfaces coated with Multiscale Carbon Structures

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Keyword: Wetting; Superhydrophobicity; Fakir State; Carbon Nanotubes; Nanostructures

Highlights

- Enhanced Water Repellency of Surfaces coated with Multiscale Carbon Structure
- A carbon flake-like nanostructure surface to achieve a robust so-called Fakir state is presented. Even micrometer-sized drops remain sited on the apex of the flake-like protrusions, while the surface features also demonstrate a good mechanical resistance against the capillary forces, whereas it is not the case for classic nanotube surfaces.
- Keyword : Wetting, Superhydrophobicity, Fakir State, Carbon Nanotubes, Nanostructures
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Abstract

Low cost and well characterized superhydrophobic surfaces are frequently required for industrial applications. Materials are commonly structured at the micro or nano scale. Surfaces decorated with nanotube derivatives synthesized by plasma enhanced chemical vapor deposition (PECVD) are of particular interest, since suitable modifications in the growth parameters can lead to numerous designs. In this article, we present surfaces that are selected for their specific wetting features with patterns ranging from dense forests to jungles with concave (re-entrant) surface such as flake-like multiscale roughness. Once these surfaces are functionalized adequately, their wetting properties are investigated. Their ability to sustain a superhydrophobic state for sessile water drops is examined. Finally, we propose a design to achieve a robust so-called “Fakir” state, even for micrometer-sized drops, whereas with classic