Recent advances in the study and design of parahydrophobic surfaces: From natural examples to synthetic approaches

Caroline R. Szczepanski, Frédéric Guittard, Thierry Darmanin

PII: S0001-8686(16)30278-0
DOI: doi:10.1016/j.cis.2017.01.002
Reference: CIS 1711

To appear in: *Advances in Colloid and Interface Science*

Please cite this article as: Szczepanski Caroline R., Guittard Frédéric, Darmanin Thierry, Recent advances in the study and design of parahydrophobic surfaces: From natural examples to synthetic approaches, *Advances in Colloid and Interface Science* (2017), doi:10.1016/j.cis.2017.01.002

Recent Advances in the Study and Design of Parahydrophobic Surfaces: From Natural Examples to Synthetic Approaches

Caroline R. Szczepanski, Frédéric Guittard and Thierry Darmanin*

*thierry.darmanin@unice.fr

Université Côte d'Azur, NICE Lab, IMREDD, 61-63 Av. Simon Veil, 06200 Nice, France

Abstract

Parahydrophobic surfaces are an interesting class of materials that combines both high contact angles and very strong adhesion with wetting fluids, most commonly water. This unique set of properties makes parahydrophobic surfaces attractive for a variety of applications, including water harvesting and collection, guided fluid transport, and membrane development, amongst many others. Taking inspiration from natural surfaces that display this same behavior such as rose petals and gecko feet, synthetic approaches aim to incorporate the nano- and micro-scale topography as well as the low surface energy chemistry found on these interfaces. Here, we discuss the chemical and physical factors that contribute to parahydrophobic behavior and provide a comprehensive overview on the current technologies and procedures used towards constructing surfaces that mimic this behavior already observed in nature. This includes etching processes, colloidal assemblies, deposition methods, and *in situ* growth of surface features. Furthermore, issues such as ease of scale-up, efficiency of technical procedures, and other current challenges associated with these methods will be discussed to provide insight as to the future directions for this growing area of research.

Keywords: Superhydrophobic, Parahydrophobic, Adhesion, Wettability, Bio-inspired.