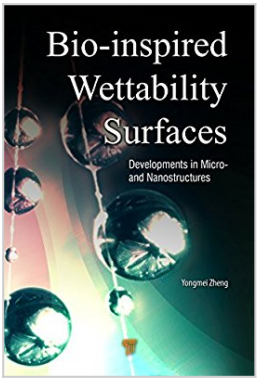

Bio-Inspired Wettability Surfaces: Developments in Micro- and Nanostructures

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Bio-Inspired Wettability Surfaces: Developments in Micro- and Nanostructures From Pan Stanford

Through natural evolvement in thousands of years, biosurfaces have become highly adaptable to display their biological functions perfectly. Interestingly, they have developed micro-/nanostructures with gradient features to achieve smart wetting controls, such as ultra-hydrophobic water repellency in lotus leaf, directional water collection in wetted spider silk, directional adhesion in superhydrophobic butterfly wing, and fog-collecting hydrophobic/hydrophilic pattern on beetle back. These surfaces provide endless inspiration for the design and fabrication of functional interface materials with unique wettability, generating promising applications such as micro-fluidic devices, functional textiles, corrosion resistance, liquid transportation, antifogging, and water-collecting devices. In recent years there has been an exciting confluence of research areas of physics, chemistry, biology, and materials science to develop functional micro- and nanosurfaces. A kernel consists of organic materials with high/low surface energy and regular/irregular order/disorder, which can be rough/smooth and endlessly arranged and combined with various styles of micro- and nanostructures.

This book introduces recent research on wettability of biological and bio-inspired surfaces. It discusses the mechanism of smart wetting controls, such as water collection/repellency on biological micro-/nanostructure gradient interfaces. It suggests ways to mimic these biological features to realize bio-inspired functional surfaces with unique wettability. The book will help researchers innovate designs with novel materials for future scientific works.

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Editorial Review

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Yongmei Zheng is a professor at the School of Chemistry and Environment, Beihang University, Beijing, China. She received her master's degree from the Department of Applied Physics and her doctorate from the School of Communications and Information Engineering, Jilin University, China. She worked as a postdoctoral fellow in Lei Jiang's group at the Institute of Chemistry, Chinese Academy of Sciences (ICCAS), Beijing, and also as an associate professor at the National Center for Nanoscience and Technology, Beijing, and the School of Chemistry and Environment, Beihang University, Beijing. She also conducts her research in the Key Laboratory of Bio-inspired Smart Interfacial Science and Technology of the Ministry of Education, Beijing. She has published over 30 articles in international peer-reviewed journals, has been part of more than 10 conferences and presentations, and has 7 patents to her credit. Her current research focuses on the study of wettability functions of biological surfaces with unique gradient micro-/nanostructure and the preparation of artificial functional surfaces by various techniques and methods to mimic the unique features of biosurfaces.

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