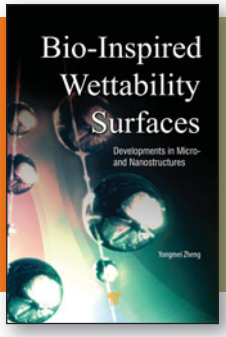


Bio-Inspired Wettability Surfaces: Developments in Micro- and Nanostructures

Yongmei Zheng

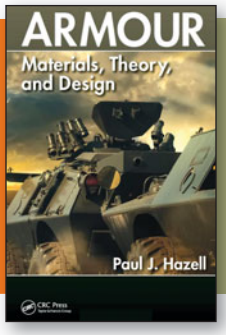
Pan Stanford, 2015
216 pages, $134.96 (e-book $104.97)
ISBN 9789814463607

This monograph unveils a series of natural phenomena for scientists to design and discover novel micro- and nanostructure patterns built by exploiting surface features of various microheterogeneous systems. It comprises slightly more than 200 pages structured in four chapters, each starting with a theoretical background on the natural phenomena involved, and following with their translation to methods specific to nanofabrication in promising applications. The work is well illustrated with figures, including relevant scanning electron microscope images and contact-angle measurements provided from recent bibliographic references.

Being at the boundary of classical physical chemistry of colloids and the emerging fields of nanosciences and nanotechnologies, four examples of wettability surface effects provided by some plants and animals are explained in detail and exploited to create novel artificial surfaces and functions: ultra-hydrophobic water repellency on a lotus leaf (chapter 1), direction adhesion of a super-hydrophobic butterfly wing (chapter 2), directional water collection on wetted spider silk (chapter 3), and the fog-collecting hydrophilic/hydrophobic pattern on a beetle's back (chapter 4). These concepts represent strong and versatile tools to imagine template-mimicking methods able to transfer nature's intelligence into valuable smart bioinspired materials and nanostructures. Indeed, the key points of this monograph stand in the wide applicative potential and development perspectives in various key-enabling technologies, such as stimuli-responsive superoleophobic materials (pH, thermal, ultraviolet, electric, magnetic) for lab-on-chip systems, biosensors, drug delivery, and nanodevices, to benefit human health, energy, and environment in the near future.

This book particularly addresses specialists in materials science, colloidal chemistry, physics, chemical and metal engineering, polymer science, mechanics, energy fuels, and environmental science and technology who have an interest in bioinspired wettability of surfaces.

Reviewer: Aurelia Meghea *is emeritus professor at the University Politehnica of Bucharest, Romania.*



Armour: Materials, Theory, and Design

Paul J. Hazell

CRC Press, 2015
395 pages, $125.96 (e-book $97.97)
ISBN 9781482238297

There are few materials-based technologies that have had a larger impact on human society and civilization than armor, as its robustness and ability to either be defeated or withstand defeat has decided the course of nations. However, I cannot recall thinking of armor during my studies and research as a materials scientist before reading Paul J. Hazell's book on the topic. But I am now grateful to have the opportunity to understand it better.

Hazell is a professor from the University of New South Wales (UNSW), Australia. He presently serves as the professor of impact dynamics in the School of Engineering and Information Technology at UNSW Canberra. In the book preface, he also claims a history of teaching at defense academies in both the United Kingdom (UK) and Australia.

Hazell's experience and clear understanding of the topic of armor is apparent in his book. The author easily demystifies how armor is used and behaves and its interactions with munitions. After a basic introduction to the mechanics of materials, the book describes the basic mathematics associated with bullets, blast, jets, and fragments. From there, chapters are focused on penetration mechanics and stress waves before the book returns to its materials focus with chapters on the structure and performance of metallic, ceramic, woven fabric, and reactive armors. Numerous examples are given on how to calculate the damage, fragments, or failures that occur with different materials combinations, ballistic designs, and structures for different penetration and stress conditions. The book wraps up with chapters on human vulnerability and testing techniques. Each chapter contains questions to technical problems along with answers. The book also gives the origin of many of the calculations used with the science and engineering of armor, as much of the math was determined over a century ago and is semi-empirical. The result is a critical perspective on the errors associated with many of the semi-empirical calculations.

As someone who was not very knowledgeable about armor at the onset of reading, I found the book extremely informative. While the actual design of armor and the defeat of it has the basis in much deeper mathematics and studies

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