

Laser Texturing – a Flexible and Efficient Tool for Producing Surfaces with Superior Wetting Properties

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The wettability is an important property of a solid surface that can be characterized by the static contact angle. As shown by many examples in nature [1] the introduction of surface roughness may result in super-hydrophilic (extremely wettable) and super-hydrophobic (extremely water repellent) surfaces. In last 15 years, the surfaces with superior wetting properties gained significant scientific interest since they enable many important technological breakthroughs in different areas, including enhanced heat transfer [2] and corrosion resistance [3].

Artificial surfaces with superior wettability have been successfully fabricated via various chemical and other methods. Nonetheless, in last decade laser surface texturing [3, 4, 5] has proved as a novel and flexible micro/nano-technology for producing surfaces with micro/nano structure due to laser ablation and melting. This contribution reviews two main principles of laser texturing of super-hydrophobic surfaces. The first one is a low-fluence laser ablation with polarized beam resulting in so called laser-induced periodic surface structures (LIPSS) [4, 6], while the second one is a high-fluence laser ablation leading to micro-channels [3, 5]. Both principles can be used to produce surfaces with superior wettability. Recent results of using low-cost, ns-marking-laser texturing for producing surfaces with superior wettability will be also presented. Such a cost-effective approach opens new possibilities for dissemination of this technology into different industrial applications.

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