

“Designing biofunctional interfaces with special wettability: from superhydrophobicity to cell microarrays”

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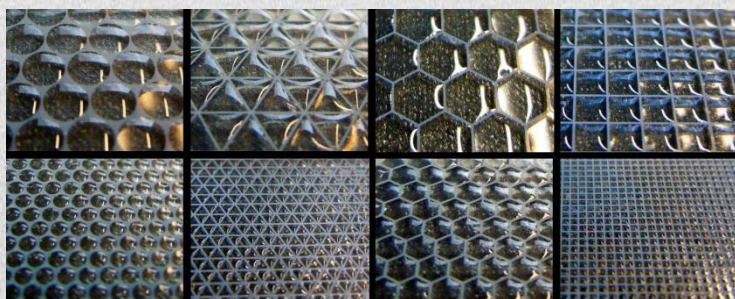
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Time: 10:30am to 12:00noon

Venue: Meeting Room 2-130, 1/F, Block 2, To Yuen Building

Abstract

Patterns of different surface properties are ubiquitous in nature and serve various important purposes. Desert beetles exploit superhydrophilic spots on their superhydrophobic back to collect water from the morning mist in the desert. Hydrophilic spots on a superhydrophobic surface of lichen plants allow them to uptake water, but also prevent the formation of water layers on the surface that could interfere with the discharge of lichen spores into the air. Superhydrophobic and omniphobic surfaces possess various unique properties including self-cleaning, liquid repellent and cell repellent properties. We develop methods for creating precise two-dimensional micropatterns of apparently incompatible and opposite properties such as superhydrophobicity and superhydrophilicity or slippery and adhesive properties. Combining seemingly opposite properties on the same surface in micropatterns can lead to novel functionalities. For example, superhydrophobic-superhydrophilic patterned surfaces[1] could be used to create patterns of live cells, arrays of microdroplets for high-throughput cell screenings,[2] formation of arrays of hydrogel micropads or free-standing hydrogel particles with defined shapes for 3D cell culture. Patterned liquid-infused interfaces can be used to form cell microarrays or arrays of isolated biofilm colonies for biofilm screenings.[3]



1. E. Ueda E. and P. A. Levkin, Advanced Materials, 2013, 25, 1234
2. A. Popova et al. Advanced Materials, 2015, 27, 5217
3. J. Bruchmann et al. Adv. Healthcare Mater. 2017, 6

Biography

Dr Pavel A. Levkin is head of the Biofunctional Materials research group at Karlsruhe Institute of Technology (KIT), Germany. He graduated from the Institute of Fine Chemical Technology, Moscow and obtained his Ph.D. in Organic Chemistry from the University of Tübingen in Germany, followed by a postdoctoral work at the University of California, Berkeley with Jean M.J. Fréchet and Frank Svec. Pavel Levkin is a recipient of the Heinz Maier-Leibnitz Prize, Ewald-Wicke Prize, an ERC Starting Grant, and a cofounder of ScreenFect GmbH and Aquarray GmbH. His research focuses on the development of functional and responsive materials, and surfaces for biomedical and biotechnological applications.

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All are welcome !