Polymeric surfaces with controlled wettability exhibiting unidirectional features

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The development of artificial smart surfaces has gained the interest of the scientific community the last decades. There have been great efforts by the researchers to understand and control the wettability of the solid surfaces. The inspiration for producing such surfaces comes from nature [1]. Lotus and rice leaves, striders legs, the wings of some insects, rose petals and shark skin are some of the biological species that the researchers have tried to imitate. This is due to the wide range of applications that water-repellent surfaces have in daily life, industry and agriculture. Depending on the type of coating deposited onto such surfaces, pH-, photo-, electro-, chemo- responsiveness can be attained [2,3]. Herein, we focus on surfaces with controlled, switchable wettability in response to one or more external stimuli. Furthermore, the aim is to create surfaces with unidirectional wettability, which may in turn be used as benchtop for novel microfluidic devices such as chemical switches/gates or in lab on chip technologies [4]. Such complex surfaces require advanced design, combining hierarchically structured surfaces with suitable polymeric materials.

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