Bioinspired Textures on Photosensitive Surface

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Surface has been one of the most interesting regions on materials since it determines the interaction between materials and the outer environment. Various approaches have been developed to produce unique surfaces with their own specific goals, from a better implant material in the human body to a better solar cell. Among many surface modification approaches, building a physical texture is one of the most popular approaches. By varying many parameters of the texture, e.g., shape, size, and distribution, the surface properties can be manipulated, eventually affecting the materials performance in their applications.

Mimicking the nature, properly designed superficial textures can be fabricated onto the materials to afford the same function as its natural counterpart, yet with additional advantages from the materials used [1]. However, to find cost-effective methods that can achieve the similar degree of complexity to its natural origin is still a challenge.

Nowadays, azopolymers (polymers containing azobenzene chromophores) have emerged as one of the promising materials for cost-effective and less time-consuming surface texturing. Azo-polymers are well-known for their photo-responsive properties. Byexposing it with UV-visible light, cyclical *cis-trans-cis* isomerations of the azobenzene molecules happen, leading to athermal material transport on the free surface of the hosting material [2]. The dependence of such phenomenon on light properties e.g., polarization, intensity, wavelength, and exposure dose,allows a unique control for building new and complex textures with simple steps.

Here, we present our effort in recent years in studying the potency of azopolymer and the optical techniques to produce patterned textures with directional and programmable anisotropy. The studies range from grating-like formation using interference intensity patterns to reversible and anisotropic reconfiguration of pillar arrays using different polarization states of light. Furthermore, the exploration reaches the level application in the directional wettability.

[1] Bharat Bhushan, *Langmuir*, 28 (2012) 1698-1714.

[2] Stefano L. Oscurato, Marcella Salvatore, Pasqualino Maddalena, and Antonio Ambrosio, *Nanophotonic*, 7 (2018) 1387-1422.