

Micro/nano-structured functional surfaces and devices by laser processing

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The need for advanced materials and systems with new functionalities has motivated the development of micro/nanostructures on solid surfaces, which are necessary for the fabrication of functional devices for novel applications. In this talk, we will discuss the development of functional micro/nanostructures, based on laser-processed surfaces. Laser micro/nanofabrication presents distinct advantages, such as low cost, simplicity (tabletop apparatuses, maskless processes), large-scale potential, high spatial resolution (localized modifications, of the order of the optical wavelength).

Coating micro/nanostructures with thin metallic films results in plasmonic substrates with enhanced electromagnetic response across the entire visible range, which are used for plasmonic optical trapping [1] and surface-enhanced Raman spectroscopy (SERS) [2]. “Smart” surfaces of controllable extreme wetting states are obtained by combining thermoresponsive polymers or photoresponsive metal oxides with micro/nanostructured substrates [3]. Also, surfaces with controlled topography, either at the micro- or at the nano-scale, for targeted cell cultures for biomedical applications [4]. We will present recent advances in these fields and discuss future applications.

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1. D.G. Kotsifaki, M. Kandyla, and P.G. Lagoudakis, *Scientific Reports* 6, 2016, P. 26275.
 2. M. Kanidi et al., *Journal of Physical Chemistry C* 123, 2019, P. 3076.
 3. M. Kanidi et al., *Applied Surface Science* 527, 2020, P. 146841.
 4. M. Kanidi et al., *Biointerphases* 17, 2022, P. 021002.