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Editorial

Special Issue "Micro and Nanotechnology: Application in Surface Modification"

Kosmas Ellinas [1,*] and Panagiotis Dimitrakellis [2,*]

[1] Department of Food Science and nutrition, School of the Environment, University of the Aegean, GR 81400 Myrina, Greece
[2] Department of Chemical and Biomolecular Engineering, University of Delaware, 150 Academy St., Newark, DE 19716, USA
* Correspondence: kellinas@aegean.gr (K.E.); pdim@udel.edu (P.D.)

Surface modification is crucial to the fabrication of (multi)functional materials and interfaces for a range of applications, such as superhydrophobic and self-cleaning surfaces, anti-biofouling and antibacterial coatings, dropwise condensation, packaging materials, sensors, catalysis, and photonics. All applications require precise surface engineering through tailoring the surface chemistry of the materials and structuring at the micro and nanoscale. Accordingly, several top-down and bottom-up processes have been developed, yet these new functionalities have imposed new requirements for surface engineering.

This Special Issue (SI) of *Processes*, "Micro and Nanotechnology: Application in Surface Modification", contains recent research studies in surface modification using micro- and nanotechnology-based processes towards the fabrication of the next generation of functional surfaces with improved performance and durability. It also includes high-quality review papers that discuss cutting-edge technologies and provides perspectives and challenges. The SI has published eight papers that cover a variety of research topics and they are summarized below.

Zhang et al. [1] in their paper "Surface Modification of Bombyx mori Silk Fibroin Film via Thiol-Ene Click Chemistry", proposed a strategy to modify the surface chemistry of Bombyx mori silk fibroin (SF) film via a thiol-ene click reaction. It was found that the thiol-ene click chemistry process did not significantly affect the thermal stability of SF films, indicating the potential for the incorporation of functionalized SF films in several applications.

Dimitrakellis et al. [2] in their paper "Plasma Surface Modification of Epoxy Polymer in Air DBD and Gliding Arc", studied the epoxy polymer surface modification using air plasma treatment in a Gliding Arc (GA) plasma reactor and a pulsed Dielectric Barrier Discharge (DBD). The polymer surface was functionalized with polar functional groups as evidenced by the wettability enhancement and FTIR spectroscopy measurements, while nano-roughness was also induced after the DBD plasma treatment.

Shamsuri & Jamil [3] in their review paper "Functional Properties of Biopolymer-Based Films Modified with Surfactants: A Brief Review", discuss the functional properties of biopolymer-based films modified with different types of surface-active agents (surfactants). Both solution- and emulsion-based biopolymer thin films were functionalized with non-ionic, anionic, cationic, and amphoteric surfactants.

Uricchio & Fanelli [4] in their review paper "Low-Temperature Atmospheric Pressure Plasma Processes for the Deposition of Nanocomposite Coatings", discuss the advances in the field of nanocomposite (NC) coating deposition using cold atmospheric plasmas. This technology offers enormous opportunities for the fabrication of advanced NC coatings with tunable composition, structure, and morphology. Of particular interest is the development of aerosol-assisted deposition processes in which the use of either precursor solutions or nanoparticle dispersions in aerosols enable to combine a range of constituents in the plasma coatings.

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Tamoor et al. [5] in their paper "Modelling of Applied Magnetic Field and Thermal Radiations Due to the Stretching of Cylinder", presented a numerical approach to explore the analysis of magneto fluid in the presence of thermal radiation combined with mixed convective and slip conditions.

Thomas et al. [6] in their work "Droplet Dynamics on a Wettability Patterned Surface during Spray Impact", reported wettability patterns as a passive method to manipulate the flow and heat transport mechanisms in many physical processes and industrial applications. The paper proposed a rational wettability pattern comprised of multiple superhydrophilic wedges on a superhydrophobic background, which can continuously remove impacted spray droplets from the horizontal surface.

In the paper by Koukouvinos et al. [7] "Fluorescence Enhancement on Silver-Plated Plasma Micro-Nanostructured 3D Polymeric Microarray Substrates for Multiplex Mycotoxin Detection", oxygen plasma micro-nano textured poly(methyl methacrylate) slides were modified through silver microparticle deposition to create microarray substrates that enhance their emitted fluorescence intensity. They found that the signal increase was not accompanied by a significant increase in the non-specific signal or spot signal variability.

Finally, in the featured review article by Ellinas et al. [8] "A Review of Fabrication Methods, Properties and Applications of Superhydrophobic Metals", methods to tailor the surface chemistry and topography to control the wetting properties of metallic surfaces were described and evaluated providing a detailed overview of the most promising methods to achieve sustainable superhydrophobicity.

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