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Editorial

Nanofabrication and Nanomanufacturing

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Nanotechnology is a broad area integrating different research disciplines, including but not limited to material science, engineering, physics, chemistry, polymer science, optics, electronics, robotic, metallurgy, pharmacology, pharmacy and medicine. The Nanotechnology appellation has been used in different contexts: designing materials at the nanometric scale (synthesis, fabrication, etc.) and manipulation of nanomaterials and investigation properties at the nanodimensional level (mechanical, optical, electrical, etc. <https://www.mdpi.com/2079-4991/12/2/177> (accessed on 30 November 2021)). Nanotechnology has found applications in different fields, such as food security, agriculture, medicine, energy, automotive, environmental protection, electronics, textiles and cosmetics.

The tuning of the morphology, size, porosity, organization, crystallinity and chemical composition of materials at the nanoscale, as well as their interfaces (surface charge, chemical function, hydrophobicity/hydrophilicity, etc.), is crucial to control their properties and allow their applications in various fields, such as electronics, photonics, energy, life sciences and the environment. The aim of this section is to focus on nanoprocessing approaches that allow us to create novel nanostructures and architecture by using innovative synthesis, fabrication and manufacturing methods, enabling the control of their properties, as well as their applications.

Research interests in the Section “Nanofabrication and Nanomanufacturing” include but are not limited to the following: synthesis, fabrication and manufacturing of nanostructured and nanoscale materials (bottom up and/or top down approaches); design of nanoparticles, quantum dots and clusters with control morphology and complex structures (core/shell, alloy, etc.); formation of 1D nanostructures (nanofibers, nanotubes, nanowires, nanorods, etc. <https://www.sciencedirect.com/science/article/abs/pii/S2352940719305414> (accessed on 30 November 2021)); 2D materials and their heterostructures (graphene-based materials, silicate clays, layered double hydroxides, transition metal dichalcogenides, transition metal oxides, black phosphorus, hexagonal boron nitride, graphitic carbon nitride, etc.); coatings and thin films (Atomic Layer Deposition, Chemical Layer Deposition, etc. <https://pubs.acs.org/doi/abs/10.1021/acs.chemmater.8b02687> (accessed on 30 November 2021)); hybrid nanostructures (organic/inorganic); nanocomposites; self-assembly and organization; nanostructured materials, such as Zeolites, MOFs and membranes (<https://www.mdpi.com/2079-4991/9/11/1552> (accessed on 30 November 2021)); nanomaterial features tuned by the nanofabrication/nanomanufacturing approaches (catalytic activity; electrical, mechanical, magnetic and optical properties).

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Short Biography of Author

Mikhael BECHELANY (born in March 1979) obtained his PhD in Materials Chemistry from the University of Lyon (France) in 2006. His PhD work was devoted to the synthesis and characterization of silicon and boron-based 1D nanostructures (nanotubes, nanowires and nanocables). Then he worked as a post-doc at EMPA (Switzerland). His research included the fabrication of nanomaterials (nanoparticles and nanowires), their organization and their nanomanipulation for applications in different fields, such as photovoltaic, robotic, chemical and biosensing. In 2010, he became a scientist at CNRS. His current research interest in the European Institute of Membranes (UMR CNRS 5635) in Montpellier (France) focuses on novel synthesis methods for metals and ceramics nanomaterials, such as Atomic Layer Deposition (ALD), electrodeposition, electrospinning, 3D printing and/or on the nanostructuring by using natural lithography (nanospheres and/or membranes). His research efforts include the design of nanostructured membranes for health, environment and renewable energy. As of the end of 2021, he is the author and co-author of more than 275 publications, 15 book chapters and 9 patents (h-index = 53). He is also the co-founder of three startups.