

Special Issue: Innovations in Semiconducting Block Copolymers

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The current Special Issue entitled “Innovations in Semiconducting Block Copolymers” aims to discuss cutting-edge research regarding the synthesis, characterization and application of semiconducting block copolymers, with a special focus on the realization of novel and innovative nanostructured materials for the production of advanced devices suitable in different fields, ranging from sensors applications to optic photovoltaics.

Block copolymers have long been exploited to obtain thin-film architectures with controlled morphology, thanks to their capacity to self-assemble [1]. In fact, a variety of nanoscale morphologies have been reported, such as lamellar, spherical, cylindrical, vesicular and microporous structures [2]. Moreover, it has been demonstrated that semiconducting block copolymers can be used as active layers in OPV devices and solar cells, thanks to the possibility to obtain a continuous phase of donor and acceptor components in the desired nanometer domain scale [3]. In this context, the self-assembly capability of peculiar semiconducting block copolymers has been demonstrated in aqueous media, leading to the preparation of water-processable nanoparticles (NPs) composed of a blend containing a semiconducting polymer and a fullerene derivative. This original approach recently emerged as a smart strategy to control the nanoscale morphology and reduce the use of harmful solvents [4–6].

The research interest of this Special Issue thus includes, but is not limited to, the following: production and characterization of nanostructured and semiconducting active materials; study of the hierarchical organization of block copolymer nanostructures; device production and characterization. Moreover, the study of the structure–morphology relationship of semiconducting block copolymers, neat or in blend with other materials to achieve complex composites with innovative properties, is a central topic of this Special Issue.

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Short Biography of Authors

Francesca Villafiorita-Monteleone graduated in Biomedical Engineering at Politecnico di Milano in 2007 and she received her PhD in “Interdisciplinary Sciences and Technologies”, with a specialization in “Nanosciences and Grid Computing” in 2011, with the thesis “Patterning and Surface Wettability Control of Polymer Nanocomposite Coatings: Implementation in Microfluidic Systems”. From 2012 to 2016 she worked at “Istituto per lo Studio delle Macromolecole (ISMAL-CNR)” in Milano (Italy) and from 2017 to 2018 she worked at “Istituto di Biofisica (IBF-CNR)” in Milano (Italy). She is currently a researcher at “Istituto di Scienze e Tecnologie Chimiche “Giulio Natta” (SCITEC-CNR)” in Milano (Italy). Her work is centered around the morphological and optical characterization of smart materials suitable as sensors, OPV devices, etc.

Stefania Zappia graduated in Chemistry and Pharmaceutical Technologies (CTF) at the Department of Chemistry and Industrial Chemistry of the University of Genova in 2009. In 2012 she worked at the Centro de Investigación en Química (CIQA), in Saltillo (Mexico). In 2013 she obtained her PhD in Chemical Sciences and Technologies, working on the synthesis and characterization of organic and metal-organic hybrid materials for sensoristic and photovoltaic applications. Since 2013 she joined to the National Research Council (CNR), working at “Istituto per lo Studio delle Macromolecole (ISMAL-CNR)” in Milano (Italy). Currently, she is a researcher at “Istituto di Scienze e Tecnologie Chimiche “Giulio Natta” (SCITEC-CNR)” located in Milano.