



***Research Doctorate (Ph.D.) in Chemical Sciences
XXXV Ciclo – Academic Year 2019-2020***

PI: Claudio De Rosa, Finizia Auriemma

Project Information

1. Research project title

Polymer nanostructures of tunable periodicity from hierarchical self-assembly and crystallization of crystalline block-copolymers.

2. Key words

Block copolymers, self-assembly, phase-separation, crystallization, nanostructures and nanotechnologies.

3. Research project abstract

The aim of this project is the study of a novel class of polyolefin block copolymers (BCP) containing crystallizable blocks of stereoregular polyolefins or polyesters able to produce nanostructures of tunable periodicity and characterized by high melting temperature domains. The semicrystalline block copolymers will be obtained using metallorganic catalysts composed of complexes of transition metals, able to promote the stereoselective and living polymerization of olefins. This bottom-up approach based on the self-assembly of BCPs coupled to the crystallization of one or more blocks of the BCP allows producing innovative nanostructures with size of microdomains and periodicity easily engineered by controlling the molecular structure, that is, type of linked polymer blocks and their molecular masses. For the effective exploitation of this approach it is of paramount significance the control the self-assembly process and the orientation of the nanodomains to obtain highly ordered and periodic nanostructures. This task will be achieved through a design of novel molecular structures of the BCPs and the use of innovative processing techniques for controlling crystallization and phase separation.