



Orietta Monticelli

Associate professor

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Education and training

1992

Laurea degree with honours in Industrial Chemistry

1997

Ph.D. in Chemistry

Academic experience

1999 - 2014

Assistant Professor

Genoa University

2014 - ONGOING

Associate Professor

Research interests

Monticelli's scientific activity concerned various fields of Industrial Chemistry, such as catalysis, membranes, high performance polymers, biopolymers and nanotechnologies. The different knowledge acquired allowed her to address the various research topics from a widely interdisciplinary perspective.

Starting from 1999, as a university researcher, Orietta Monticelli carries out her activity in the field of polymeric materials. Initially, she was involved in the synthesis and characterization of hyperbranched polymers and, subsequently, also of copolymers. In order to deepen the culture on this topic, which represented a completely new field of research for her, Orietta Monticelli actively collaborated with the research group led by Prof. B. Voit (Institut für Polymerforschung of the University of Dresden, Germany) which is one of the most active European research group working in the field of hyperbranched polymers. The collaboration involved exchange of students and Ph.D students and a stay of Orietta Monticelli at the German laboratories for almost two months in the framework of the DAAD exchange programme.

More recently, from 2003 until today, the research activity of Orietta Monticelli has turned to nanostructured materials, a field in which her previous knowledge on inorganic and polymeric materials has been merged. The research was developed within several national projects (FIRB,

PRIN and FISR) and within the European Nanofun-Poly Network coordinated by Prof. J.M. Kenny (Department of Civil and Environmental Engineering, University of Perugia, Terni). These activities led Orietta Monticelli to collaborate with numerous national and international research groups, in particular with a research group working at the Politecnico of Turin. In particular, Orietta Monticelli studied the preparation of polymer nanocomposites, applying the in situ polymerization technique, using different inorganic nanofillers such as layered silicates, FIRB project and FISR project, silicas and polyhegral oligomeric silsesquioxane (POSS) (PRIN projects *Design and synthesis of multifunctional polyhedral silsesquioxanes for thermally stable polymer composites* and *Advanced polymeric compounds and nanocomposites with low environmental impact*), carbon nanotubes (PRIN project *New functional hybrid materials based on carbon nanotubes and polymers for photovoltaic devices*) and graphene (PRIN project *New nanocomposites based on graphene*).

Starting from 2008, Orietta Monticelli organized her own research group, concentrating her interest on the development of nanocomposites and on formulations based on biopolymers. In particular, Monticelli's research interest focused on the study of the preparation of nanocomposites based on metal POSS and POSS, using both in-situ polymerization and unconventional techniques such as reactive blending or vapor phase grafting. In this field, Orietta Monticelli proposed an innovative application of metal POSS in the lactide ring opening polymerization, for the synthesis of polylactic acid. The process, allows to obtain a hybrid system, characterized by the presence of POSS anchored to the macromolecular chain.

Moreover, within the PRIN 2008 (*Functionalization of graphenes and their use in nanocomposite polymer systems*), whose Orietta Monticelli was the local coordinator, novel hybrid systems based on graphene were developed in collaboration with the other research units, by applying the in-situ polymerization technique. In particular, the experience gained in the preparation of nanocomposites based on POSS, allowed Orietta Monticelli, in collaboration with the Department of Civil and Environmental Engineering of the University of Perugia, to propose an innovative functionalization of graphene oxide using silsesquioxane molecules characterized by peculiar functionalities. In the field of nanostructured material, Monticelli's group is actively working on the development of nanostructured nanofibres, using the electrospinning technique. The research was, in part, carried out in collaboration with the Science and Technology Center of Tufts University (Medford, MA, USA). More recently, the group also developed a new catalytic system consisting of polylactic acid nanofibers decorated with Pd nanoparticles. Moreover, the recent interest of Orietta Monticelli has moved towards the development of novel formulations based on bio-polymers and in particular on polylactic acid (PLA), a material of great application interest in several fields such as packing and bio-medical. Her research mainly deals with the modification and functionalization of PLA, with the aim of making up for its well-known drawbacks and widening its range of applications. The work has been mainly focused on the synthetic manipulation of the polymer structure and

on the functionalization of PLA by using nanoparticles, hyperbranched polymers and dendrimers to render the polymer matrix a suitable support/absorber for metal precursors, drugs and change the surface properties.