



Workshop for PhD students

Wednesday 13 March 2019, aula H

13:50 Welcome by Prof. Leonard Prins

14:00 – 14:50 Prof. Davide Bonifazi (Professor of Organic Supramolecular Chemistry School of Chemistry, University of Cardiff, Wales)

A colorful chemical world

There has never been a time when colour did not fascinate humanity and it has always been regarded as one of life's greatest mysteries. Every civilisation has been captivated by colours and experimented the use and preparation of new pigments, bringing revolutions in cosmetics, art and fashion, but also in other fields such as communication and energy conversion technologies. Thus the preparation of new colouring materials has evolved from the talent of artisans to transform known bulk materials to the skill of chemists devising new dyes at the molecular scale. Indeed, a timely challenge regards the preparation of efficient light-emitting or light-adsorbing architectures that, organised at the molecular and microscopic scale, can be employed in light-energy conversion applications and optoelectronic devices operating under a low-energy-consumption regime. This lecture will focus on our efforts to develop bottom-up synthetic routes that, mimicking natural architectures, can lead toward the construction of artificial light-harvesting antennas, luminescent and chromogenic materials/devices that may exhibit any desired colour.

14:50 - 15:10 Coffee break

15:10 – 16:00 Prof. Enrico Dal Canale (Dipartimento di Scienze Chimiche, della Vita e della Sostenibilità Ambientale, Università di Parma)

Stimuli responsive polymers via molecular recognition

In the last few years the merging of polymer science with supramolecular chemistry has created a new, thriving field of research, (1) known under the name of supramolecular polymer chemistry. (2) The driving force behind this methodological breakthrough is the ability to control noncovalent interactions with the same precision achieved by synthetic organic chemistry. Molecular recognition is the most sophisticated form of weak interaction in terms of precise responsiveness, since it requires a well-defined arrangement of complementary non-covalent interactions to operate at its best. Some of the most relevant issues associated to the development of supramolecular polymers are: (i) achieve macroscopic expression of molecular recognition, (ii) trigger stimuli specific responses in polymeric materials and (iii) move self-assembly from the nano to the meso and macroscale.

In this lecture supramolecular polymers based on phosphonate cavitands will be presented, in which the polymerization is driven by host-guest complexation (3,4). In particular, the following examples will be discussed: (i) polymer blending as macroscopic expression of molecular recognition, (5) (ii) electrochemical responsive host-guest polymers in the solid state (6); (iii) strain-field self-diagnostic elastomers (Figure 1) (7) and (iv) self-diagnostic carbon fiber composites.





Figure 1. Schematic representation of the selfdiagnostic polymer working system (above) and corresponding fluorescence images before and after

Chair of the PhD school in Molecular Sciences Prof. Leonard Prins

Il Direttore del Dipartimento Michele Maggini