

Nanostructured materials for light harvesting and conversion

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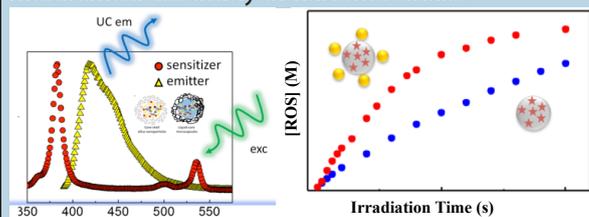


Our research interests are focused on the preparation of hybrid nanostructures with defined morphologies and tailored composition able to efficiently harvest visible-NIR radiation and spectrally shift it or convert the absorbed radiation into reactive chemical species. Examples will be given in mainly on two topics.

Emission upconversion, based on the triplet-triplet annihilation (TTA) mechanism, has been achieved in inorganic [1] or organic capsules [2]. The material preparation procedures have been developed to optimize the up-conversion efficiencies and ensure a high harvesting stability.

On the other hand, mesoporous silica particles were loaded with PDT photosensitizers [3] and functionalized with gold nanoparticles [4] are carefully assembled to obtain effective light-activated antimicrobial agents.

The synthetic procedures and the photophysical properties of the materials will be described in details, together with strategies to enhance the outcomes through the hierarchical assembly of nanomaterials.



Up-conversion emission spectrum in capsules (left panel); ROS photo-sensitization in hybrid systems (right panel).

[1] G. Massaro, P. L. Gentili, V. Ambrogi, M. Nocchetti, F. Marmottini, F. Ortica and L. Latterini, *Microp. Mesop. Mater.*, 2017, 246, 120. [2] L. Latterini, G. Massaro, M. Penconi, P. L. Gentili, C. Roscini, F. Ortica, *Dalton Trans.*, 2018. [3] G. Zampini, O. Planas, F. Marmottini, O. Gulias, M. Agut, S. Nonell, L. Latterini, *RSC Adv.*, 2017, 7, 14422. [4] G. Zampini, L. Tarpani, G. Massaro, M. Gambucci, A. Nicoziani, L. Latterini, *ChemPhotoChem* 2017, 1, 1.

Loredana Latterini is professor of Physical Chemistry at the University of Perugia. Her research activity has been characterized by a continuous evolution towards different aspects of the optical and photochemical behaviour of materials. In recent years, the research group of Prof. Latterini, has specialized in the synthesis and characterization of nanomaterials responsive to electromagnetic radiation. Through nanotechnology procedures, nanomaterials are prepared with optical and electronic properties determined by their size and by an appropriate surface functionalization and assembly.

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ISOF 12 – Meeting Room (1st floor)

CNR Research Area

Via Gobetti 101, Bologna