

Photoinduced surface initiated ATRP:

Towards microfabrications by Control Radical Polymerizations.

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In the early 20th century, the Italian physico-chemist, Giacomo Luigi Ciamician, highlighted the interest of using light as a suitable energy source for chemical reactions.

At the end of this same century, polymer chemistry had a breakthrough thanks to the discovery of Control Radical Polymerizations (CRP) allowing to regulate molecular mass, polydispersity, chain end... In particular, Atom Transfer Radical Polymerization (ATRP) was independently developed by Krzysztof Matyjaszewski and Mitsuo Sawamoto in 1995. One of the applications of this polymer growth mechanism is surface functionalization, also called surface-initiated ATRP (SI-ATRP), with brush polymer structure and with possible chain-end modifications.

Thus, this talk will present our ongoing works on the development of a new system for photoinduced ATRP of bio-oriented monomers obtaining functionalized polymers. In particular, we will discuss the possibility of inducing photo-mediated SI-ATRP by one or non-linear two photon mechanism or by Low One Photon Absorption (LOPA). This could allow getting high resolution 3D stereolithography, surface coating and functionalization.



Figure 1 - Surface functionalization by photoinduced Surface Initiated ATRP.