Multipoles-Induced Dimensionality Tuning : A Relevant Molecular Engineering Approach devoted to Multiphoton 3D-Stereolithography.

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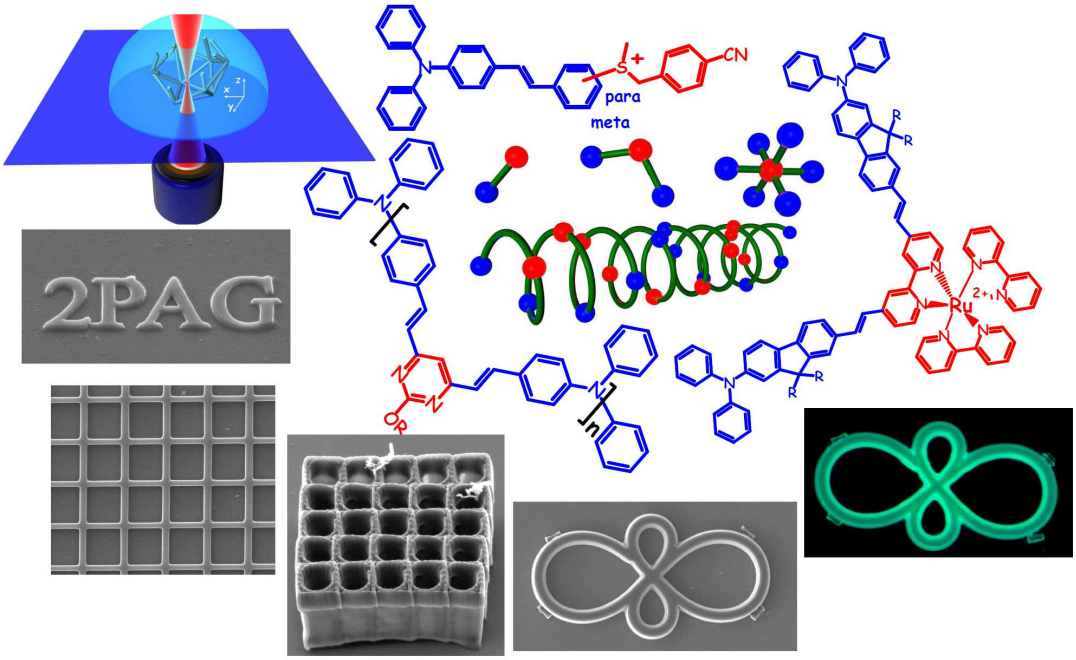
Since a decade, the field of multiphoton fabrication has developed rapidly[1,2] so that it is no longer a rapid prototyping technology but a real manufacturing technique that is commercially available. Such a mature technology is now being disseminated in diverse applied advanced domains such as photonic crystals[3], biochips, nano/micro-electromechanical systems[4], 3D imprinting of human tissues[4]. Indeed, multiphoton fabrication can make possible the fabrication of intricate 3D structures with feature sizes as small as 100 nm[1]. By tightly focusing a pulsed laser beam into a multi-photon absorbing material, it is possible to trigger a photoreaction inside a volume below the dimension of the voxel. Arbitrary structures can then be generated by moving in the laser focus in the 3 dimensions inside the monomer substrate. Due to the nonlinear intensity dependence of the photoinitiating process, the spatial confinement of the reaction is guarantee and is intrinsically dependent on two parameters: *i*) the nonlinear absorption ability of the material, *ii*) the reactivity of the excited species.

In this context, important research efforts have been devoted to design new photoinitiators that both exhibit efficient two-photon absorption ability (i.e. high two-photon absorption cross-section) and high initiating reactivity. In the present lecture, we will present some relevant supramolecular building strategies[5-10] of two-photon activable initiators whose photoreactivity is directly correlated to the fine control of their respective dimensionality.



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