

Department of Chemistry

NANO-RELEASE

Photochemistry and Supramolecular Chemistry Group



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(Post-doc)

2006 - Degree in Applied Chemistry (FCT-UNL, PT)
2010 - PhD on the synthesis and characterization of fluorescent sensors (Friedrich-Schiller Uni., GER)

Objectives

Our goal is to release biologically active agent or substances in a temporal and spatially controlled manner using light irradiation.

By attaching these substances onto nanoparticles, these latter may act as carriers into cells and bioorganisms.

Our current focus is on the release of phosphates and nucleotides, due to their importance in biosystems.

Methodology

Caged compounds have been attracting significant interest due to their potential towards the release of substances in a temporal and spatially controlled manner. Functionalizing the surface of gold nanoparticles (AuNPs) with caged molecules will allow to:

- scavenge the "cage", which is usually an organic compound and thus toxic for cells, upon releasing the therapeutic agent;
- improve the photochemistry at the surface of AuNPs, due to energy transfer via light scattering.

Thus, we designed a photocage for phosphates based on a coumarin chromophore bearing a thiol group for posterior covalent immobilization at the surface of NPs via stable Au-S bonds.

Expected Results

At the end of the fellowship, we want to understand the photochemical events regarding the release of caged phosphate, both in solution and at the surface of nanoparticles.

The results will allow us to progress towards the caging of nucleotides at the surface of AuNPs, to use in DNA/RNA synthesis via light.

