UNIVERSITÉ BLAISE PASCAL
U.F.R de Recherche Scientifique et Technique

Université Blaise Pascal

DEPARTEMENT DE CHIMIE

CYCLE DE CONFÉRENCES DE CHIMIE

Avec le concours de : ***Manufacture Française des Pneumatiques MICHELIN***
Centre de Développement Préclinique, Schering-Plough
Fédération de Chimie (FR 2404)
Section Auvergne de la Société Française de Chimie
U.F.R.S.T. / Master de Chimie / Département de Chimie

Mercredi 5 Mai 2010 à 14 h 30 (Hors cycle)

Salle C Bâtiment de Chimie (Site des Cézeaux)

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Biocrystallogenesis of nanoparticles

Natural strategies for the synthesis of nanomaterials are an important aspect of nanotechnology today. Up to now, most of the synthetic preparation methods reported rely heavily on organic solvents and the reducing agents used such as hydrazine and sodium borohydride pose potential environmental and biological risks. At present, to avoid environmental disasters, there is a growing need to develop nontoxic procedures for synthesis and assembly of nanoparticles such as biomimetic approaches for the growth of advanced materials. Biomineralization processes often imply the formation of nanoparticles or nanocrystals, organized at larger scales via the self-assembly properties of templating macromolecules. It should be also possible to use the synthetic capabilities of living cells for the design of new nanomaterials. In this work, we show that the common *Anabaena, Calothrix* and *Leptolyngbya* cyanobacteria and *Euglena* gracilis are able to form Au, Ag, Pt and Pd metallic nanoparticles and also Fe based nanomaterials such as Fe_3O_4 and FeOOH of well-controlled size and shape. The metallic nanoparticles are synthesized intracellularly, and naturally released in the culture medium where they are stabilized by the exo-polysaccharides, allowing their easy recovery. *Euglena* gracilis can synthesize Fe_3O_4 and FeOOH. The magnetic behavior of these “living” materials depends on the nanoparticle structure, size and shape. Moreover, the size of the recovered particles as well as the synthesis yield is shown to depend on the micro-algae family and genus, demonstrating the flexibility of this approach.

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