

MASTER THESIS M2 CDM (5 months, Feb. - June)

2025-2026

Title of the project: Synthesis, elaboration and characterisation of nanohybrids based on gold nanoparticles and carbon dots in aqueous media for biomedical applications

Supervisor(s): Thomas Girardet / Julien Boudon / Nadine Millot

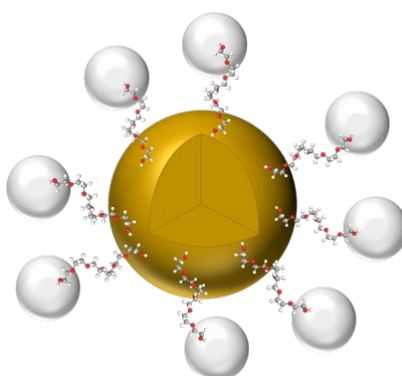
Location/ Laboratory / Department / Team: Dijon, ICB, Nanosciences, BH2N

Collaborations:

Summary:

The Nanosciences Department at the Laboratoire Interdisciplinaire Carnot de Bourgogne (ICB) aims to access and operate at the nanometric scale for various applications, particularly in the biomedical field. The aim of the BH2N (Bio Hybrid Nanoparticles Nanostructures) team within the Nanosciences Department is to work on the synthesis and characterisation of nanoparticles (iron oxide, titanate nanotubes, gold nanoparticles, ...) in collaboration with biologists and clinicians in order to use them as contrast agents, for cellular internalisation, and as biosensors.

The aim of this research internship will be to synthesise nanohybrids based on a core of gold nanoparticles with an innovative combination using carbon dots that will be grafted onto the surface. As carbon dot synthesis is a new technique that will be developed within the BH2N team, increased work on the development of this hydrothermal synthesis will be carried out at the beginning of the internship before coupling them with gold nanoparticles. Subsequently, physicochemical characterisations will be carried out to determine the nanostructure-property relationships of these nanohybrids using the equipment available at the ICB and on the ARCEM platform (including DLS, TEM, TGA, UV-Visible, XRD, Raman spectroscopy). The aim of these syntheses would be to use these nanohybrids for biomedical applications, particularly in medical imaging and molecule sensors.



Type of project (theory / experiment): experiment

Required skills: Interest in materials chemistry and detailed characterisation of nanomaterials, knowledge of nanoparticle synthesis techniques and characterisation techniques.

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