



## PhD Position

### Catalytic localism in layer-by-layer composite films for light-driven water treatment

Water treatment is a priority health issue that scientists must address. In particular, in hospitals and the care sector, wastewater is polluted by medical products (antibiotics, anti-cancerous, anti-inflammatory or contraceptive drugs). Impact on the world's population health is dramatic at short- and long-term, with eg. higher cancer risks and reduction of the human reproductive capacity, as treatments in place to date are not efficient enough. The development of new sustainable cost-effective water treatment technologies is thus necessary.

The aim of the PhD thesis is to develop novel multi-functional catalysts for solar light-driven water treatment by applying an innovative strategy of catalytic (chemical) localism. By analogy to the local production and consumption of goods supported by the localism doctrine, this new concept is proposed to combine two catalysts working in synergy under solar-light. To do so, we will rely on the bottom-up layer-by-layer self-assembly to precisely control the spatial positioning of both catalysts and the resulting properties of the multilayer catalysts. We aim finally at validating the use of non-pathogenic bacterial biofilms as sentinel (sensor) of the water quality by exploiting the capacity of biofilms to be affected by the presence of pollutants (especially antibiotics).

This full-time PhD project will be funded by the Interdisciplinary Thematic Institute (ITI) HiFunMat, a unique cluster of excellence dedicated to the development of advanced materials for chemistry, physics and biology (<https://hifunmat.unistra.fr>). Thanks to a high-level Master-Doctorate research program and a dense network of academic and industrial partners, HiFunMat aims at developing new advanced materials with appealing properties for health, environment and energy applications. With interdisciplinary training to understand the innovation and valorization aspects in research, HiFunMat responds to the strong demand in the industry for people with high profile in materials science interested in health and sustainable development.

#### Candidate profile:

This multidisciplinary work at the frontier between chemistry, materials science, nanoscience, and microbiology is intended for a candidate (M/F) with a master degree in chemistry, physical chemistry, materials science or nanoscience, with a strong motivation in microbiology. Knowledge or first experience in microbiology or biochemistry will be an asset.

The candidate (M/F) will work in a dynamic, collaborative and international multi-partner environment. Excellent communication skills (both written and oral) in English are expected, while knowledge of French is not mandatory.

#### Conditions:

- Gross salary of 2135 €/month over 36 months
- Starting date: 01/10/2023
- The work will be performed within a consortium gathering three complementary teams all located in Strasbourg, under the supervision of Dr. Nicolas Keller (ICPEES), Dr. Olivier Félix (PECMAT-ICS) and Dr. Lydie Ploux (BIOMAT).

#### Application:

Interested candidates should apply via the platform <https://emploi.cnrs.fr>, by providing a CV, a motivation letter, a copy of their Master (M1 and M2) transcripts as well as two letters of recommendation or two reference contacts, to:

[nkeller@unistra.fr](mailto:nkeller@unistra.fr) ; [olivier.felix@ics-cnrs.unistra.fr](mailto:olivier.felix@ics-cnrs.unistra.fr) ; [ploux@unistra.fr](mailto:ploux@unistra.fr)

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