



Environmentally friendly photoactive coatings for marine antifouling applications

Subject

In order to provide an ecological answer to marine biofouling, we propose to study the antifouling activity of thin films based on photoactive materials. These coatings, made of a mixture of TiO₂ and Cu₂O, combine functional properties (photo-catalysis, modulated surface energy) with microtopologies made of patterns covering a wide range of scales from nano- to micrometer. Exploratory studies have shown a decrease in the proliferation of diatoms on these coatings, without generating any measurable toxicity for planktonic species. We propose to validate and consolidate these results at different levels: at the molecular level by analyzing protein-surface interactions, at the organism level by carrying out fouling tests in the Atlantic ocean and on model organisms representative of micro and macrofouling. In addition, eco-toxicological assessments will be carried out using standardised tests on the toxicity of these Cu-based coatings.

Profile & requested skills

We are looking for candidates who have an engineering degree or a Master 2 Research degree in biotechnology, cell biology or microbiology. Theoretical or practical experience in materials science or material characterization techniques is considered a plus. We are looking for a dynamic candidate with a strong desire to engage in an interdisciplinary project. Excellent experimental rigor combined with analytical skills are a plus. We encourage candidates with a good team spirit, a sense of responsibility and good communication skills. A good command of written and spoken English is required (level B2/C1).

Academic context :

The thesis is financed by the 80 Prime programme of the CNRS, which promotes interdisciplinary initiatives in fundamental and applied research. The PhD student will work in collaboration with 3 academic partners: LMGP (Grenoble), LEMAR (Brest) and LBCM (Lorient). The PhD student will benefit from a highly multidisciplinary training ranging from the synthesis and characterisation of materials, to the study of proteins at interfaces and in vitro and in situ tests on marine organisms. He/she will develop multidisciplinary skills combining materials science and biology (from the molecular to the organism).

The PhD student will be recruited at LMGP and will be enrolled in the Chemistry and Life Sciences Doctoral School (ED CSV) of the University of Grenoble Alpes (UGA).

Application:

To apply, submit your application via the CNRS employment portal in response to the offer UMR5628-ANNDUC-002 (<<https://bit.ly/3fq1QH5>>). Upload a CV with a cover letter, letter(s) of recommendation

Date of starting October 2021

Supervisors

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