

2021-2022

Internship proposal at LMGP Lab.

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## **Ecofriendly photoactive coatings for marine antifouling applications**

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### **Abstract**

To provide an ecological solution preventing marine biofouling, we propose to study the potential antifouling activity of thin films based on photo-active materials. These coatings, consisting in a mixture of  $\text{TiO}_2$  and  $\text{Cu}_2\text{O}$ , combine functional properties (photo-catalysis, tuned surface energy) with micro topologies made of patterns covering a wide range from nano to micrometric scales.

The internship subject will aim to deposit and to characterize thin films of these materials. The selected deposition method is aerosol assisted Chemical Vapor deposition (AACVD), compatible with large surface substrates. Films characterization will be done by combining structural and morphological methods as Scanning Electron Microscopy (SEM), X-ray diffraction and Raman Spectroscopy, with functional characterization as water contact angle and photocatalytic properties. In particular, the degradation of organic compounds like orange G, will be studied as a function of the material composition for several wavelength. The use of scavengers will allow to identify the reactive oxygen species involved in the photoactivity.

The topography of the films will be also characterized by AFM and optical microscopy, in order to describe them at the nanometric and micrometric scale. After a complete characterization, the samples will be sent to our partners in Bretagne for immersion in marine environment to evaluate the antifouling response of the proposed materials

### **Project description**

### **Scientific environment:**

The candidate will work within the LMGP, Materials and Physical Engineering Laboratory, in the Funsurf and IMBM group.

Located in the heart of an exceptional scientific environment, the LMGP offers the applicant a rewarding place to work. LMGP Web Site: <http://www.lmgp.grenoble-inp.fr/>

### **Profile & requested skills:**

The ideal candidate is a highly motivated engineering school and/or Master student with knowledge in physics, nanotechnologies or material science. Aptitude for teamwork, good spoken and written English will be appreciated.

**Subject could be continued with a PhD thesis:** NO

**Allowance:** Internship allowance will be provided

### **CONTACT :**

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