



## PRO POSITION DE CONTRAT POST-DOCTORAL

12 mois



Laboratoire : Laboratoire de physique des solides – UMR 8502

Bât. 510 – Campus universitaire d'Orsay

F-91405 Orsay cedex

Directrice : Sylvian Ravy

<http://www.lps.u-psud.fr>

Team : Matière molle aux interfaces

Contacts : F. Restagno ([frederic.restagno@u-psud.fr](mailto:frederic.restagno@u-psud.fr)) et L. Léger ([liliane.leger@lps.u-psud.fr](mailto:liliane.leger@lps.u-psud.fr))

Funding : 12 months. Gross monthly salary : between 2600 et 3000 € gross/month depending on the professional background.

### **Adsorption on complex surfaces From fundamental to application perspectives**

Silicon carbide filtration membranes show superior performances as compared to oxide membranes: higher flux is observed, as well as decreased irreversible membrane clogging. Previous studies showed that compared to standard oxide inorganic membranes, organic pollutants seem to interact less with SiC surfaces. However, the exact mechanism behind these observed better performances is still unclear. The objective of this post-doc is a fundamental approach to identify the nature of the organic molecules / surface interaction. For this, model organic molecules will be chosen with different sizes, functional groups and charges. The results obtained on SiC will be compared to those on surfaces with different surface charges, as for example alumina, zirconia or titanium oxide.

The work can be divided into 2 parts:

1/ Characterization of the adsorption kinetics on model flat surfaces using multiangle and spectroscopic ellipsometry.

SiC, n and p doped SiC, Si-SiO<sub>2</sub> and Si-SiO<sub>2</sub> chemically modified surfaces will be compared to oxide surfaces having different surface charges (for example Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>).

Representative adsorbates and various electrostatic conditions will be compared to get insight into the nature of SiC-organic behavior. Tests will be made either under static or flux conditions. Moreover, the effect of organic-SiC contact time will be investigated. Taking into account the results of this screening study, competitive adsorption will be tested.

At the end of this first part of the study, the most interesting organic molecules will be selected for the second part of the study.

2/ The second part of the study will focus on the evaluation of the retention of organics by porous SiC. For this, a filtration flow cell combined with UV-Visible spectroscopic detection (or any other detection method, depending on the chosen molecules) will be constructed. Retention mechanisms on both SiC and oxide (SiO<sub>2</sub>, alumina or titanium oxide) membranes will be studied using the same adsorbates. Process parameters (concentration, flux, etc) will be studied.

The candidate will have a background in physical/chemistry with a knowledge in instrumentation and data analysis and will be interested in R&D careers.