

### Internship proposal 2009-2010

<b>Laboratory : ELCHEM (electrochemistry lab)</b>	
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#### Electrochemical organic functionalization of silicon surfaces

##### Scientific project:

The functionalization of silicon surfaces with organic molecules is an area of investigation because of the potential for several applications as molecular electronics, sensing applications, silicon-based drug delivery chips, and many others.

Stable silicon-carbon bonds among the organic monolayer and the surface of silicon permit to utilize the large repertoire of chemical transformations available through organic chemistry, permitting precise modulation of surface properties.

The goal of this project is to develop a procedure to covalently attach specific functionalized molecules on Si surfaces (flat or porous layers with different porosity) by an electrochemical way, by the generation of a carbene intermediate.

The electrochemical approach permit to generate directly on the surface the active molecule. The electrochemical generation of a carbene can be easily obtained by a reduction in organic solvent (conventional and no-conventional ones) of particular substrates. We are actually involved in the study of catalytic properties of an electrochemical generated carbene from room temperature ionic liquids (RTIL).

Because of its reactivity, we are going to study the possibility that the generated carbene reacts with the Si surface. Moreover, in order to increase the number of bonded molecules per unit area, grafted surfaces will be prepared by chemical and/or electrochemical etch.

##### Techniques in use :

cyclic voltammetry, electrolysis, electrochemical impedance, SEM

##### Applicant skills :

Normal practice in a chemical laboratory.

##### Granted internship: yes

##### C'nano IdF laboratory (France only):

**Possibility for a thesis:** yes , financial support possible after selection according to national rules.

Amount of the grant: approximately 13640 €/year (previdential contribution shall be deducted).