Internship subject

Title	**Macroporous silicon-ATRP of methacrylates**
Location	Laboratoire PMC – Ecole Polytechnique – Route de Saclay – 91128 Palaiseau
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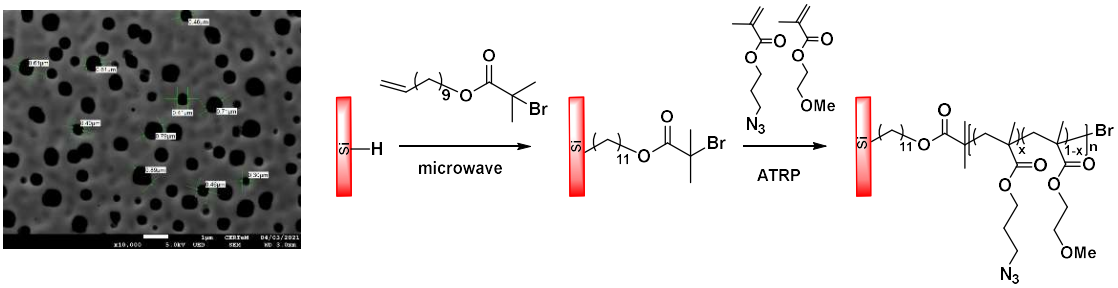
Group website	https://pmc.polytechnique.fr/spip.php?article123&lang=fr
Starting date	March/April 2023

The preparation of functionalized surfaces from already existing materials is a growing subject in materials sciences since it is possible to give properties and added value to basic and relatively inexpensive materials. Silicon is particularly interesting because its hydrogenated surface allows the grafting of organic species through robust Si-C covalent bonds, in addition to the control of the grafted species by ATR-FTIR.

This project aims at the preparation of macroporous silicon functionalized with methacrylate copolymers by surface-initiated atom transfer radical polymerization (ATRP). Initial assessment on *crystalline* silicon has already been studied; however, this internship will focus on the grafting of an initiator for ATRP on *macroporous silicon* through microwave activation. These functionalized surfaces will then be further engaged in surface polymerization of MEMA (2-methoxyethyl methacrylate) and AZMA (azido-3-propylmethacrylate) at different ratios.

This internship is multidisciplinary and will include aspects of both organic and inorganic chemistry. The candidate will handle the experiments (etching of surfaces, synthesis of the initiator, inert atmosphere reaction, use of Schlenk line…) and characterization of the materials (IR spectroscopy, NMR, contact angle, ellipsometry ...). **Required background of the candidate:** chemistry student with good knowledge of materials chemistry. The student must have lab experience.



Figures: a) Macroporous silicon (top view) and b) proposed multi-step grafting starting from a hydrogenated silicon surface.

1.Gouget-Laemmel, A. C *et al.*, Quantitative assessment of surface-initiated atom transfer radical polymerization brushes on silicon. Submitted in september 2022 in ACS Applied Polymer Materials

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