



Robust hydrophobic surface coatings

Project for a Master 2 internship, under the joint supervision of Dr Anne-Chantal Gouget and Dr Yvan Six (anne-chantal.gouget@polytechnique.edu; yvan.six@polytechnique.edu).

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Keywords: plasma activation; functional polymers; materials sciences; organic synthesis.

Introduction. The design of functional coatings that can be both reliable and robust remains an important scientific, technological, and industrial challenge. In recent years, such coatings have been increasingly required to comply with eco-responsible principles that have to align with regulations and societal expectations. It is within this context that the PMC and LSO laboratories have joined original efforts to propose alternatives to the use of PFAS (poly- and perfluorinated substances), in order to develop new, robust hydrophobic coatings.

Project. This study will be exploratory and multi-disciplinary. Our ambition is to mobilise our expertise on surface chemistry to functionalise SGR-relevant materials such as glass and plastics. In a first phase, we will work on model silicon materials in order to carry out a quantitative analysis of the grafted layers using IR spectroscopy, XPS, and SEM imaging, as well as to facilitate subsequent transposition of the experimental protocols to other types of surfaces. Grafting methods involving UV and plasma activation (done in the PMC laboratory) and covalent functionalisation with original synthetic polymers (prepared in the LSO laboratory) will be prioritised. The durability and ageing of the various coatings will be tested at the SGR center (Aubervilliers, France).

Skills acquired during the internship. Setting up and monitoring organic reactions, purifying organic products, recording NMR and IR spectra, describing novel molecules, applying UV and plasma treatments to surfaces, recording and analysing SEM images, evaluating the hydrophobic properties of surfaces (by contact angle measurements), keeping a laboratory notebook, doing literature searches, writing a scientific report, presenting results in front of an audience.

Profile of the candidate. A highly motivated student with excellent academic records. The candidate should like experimental work and have a precise and rigorous approach towards science. Ability to work within a team is also important. A background in synthetic organic chemistry will be appreciated.

Funding. A stipend of approximately €600 per month, provided in the frame of the Saint-Gobain Research chair of Ecole Polytechnique.