

EMPLOYMENT PORTAL SECTION	<p style="text-align: center;">CONTENT <small>RESEARCHER – fixed-term contract</small></p> 
Title of post	<p style="text-align: center;">2-year post-doctoral position starting from October 2022 Plasma activation for sustainable omniphobic textiles</p> 
General information	<p>Workplace : Laboratoire de Physique de la Matière Condensée –LPMC Ecole polytechnique – Route de Saclay – 91128 Palaiseau cedex Scientific Responsibles : Anne-Chantal Gouget (anne-chantal.gouget@polytechnique.edu) and François Ozanam (francois.ozanam@polytechnique.edu) Collaboration: Laboratoire de physique des plasmas (team Olivier Guaitella) Financial support: CIEDS of IP Paris (starting in October 2022 up to September 2026)</p>
Scientific description	<p>Developing sustainable omniphobic textiles without perfluoro compounds (PFC) is a challenging task today to meet the tightening of the international regulations concerning their uses. From literature and patents, it appears that oil and water repellency may be achieved by the well-controlled combination of hydrophobic silicone-type polymers PDMS together with a multiscale structuration of the coatings (ie, https://doi.org/10.1038/s41893-020-0591-9).</p> <p>In this framework, the goal of our overall 4-year project is to develop a surface functionalization of three different types of textiles combining silicone hydrophobic polymers, grafting precursors with multiple anchoring and inorganic pigments, compatible with an industrial implementation on textiles, resistant to the stresses of use (washing, friction ...). More precisely, the first task of this project is to focus on the activation of the textiles by different physical methods (UV ozonolyse and plasma treatment at low and atmospheric pressure) in order to generate various chemical functions for further covalent post-functionalization. Development of a dedicated gas line/reactor is envisioned. Several gases will be studied: argon, oxygen, dinitrogen/dihydrogen mixtures. IR spectroscopy on a commercial ATR arrangement (with a single reflection) and the development of a special multi-reflection ATR cell will allow for following and semi-quantitatively validating the surface modifications and post-modifications on realistic samples, through the appearance of absorbance bands characteristic of carbonyl, hydroxyl and/or amine functions.</p> <p>Keywords: plasma activation; textiles; surface chemistry; polymerization</p> <p>Technics: Plasma enhanced chemical vapor deposition (PECVD), IR-ATR, X-Ray photoelectron spectroscopy, scanning (or transmission) electron microscopy, contact angle measurement</p>
Context of work	<p>The consortium of the project called AMPHITEX is composed of 5 teams within 3 laboratories: the Condensed Matter Physics laboratory (PMC) and the Organic Synthesis Laboratory from the Ecole polytechnique and the unit Chemistry and Processes from ENSTA. The post-doc will be located at PMC (team Electrochemistry and thin films) in close collaboration with the team of Olivier Guaitella from LPP (Plasma Physics Laboratory) from Ecole Polytechnique. One thesis and two 2-year post-doc positions will be hired during the project starting in October 2023 with a total budget of ~ 1000 k€.</p> <p>PMC is one of 22 laboratories located at the Ecole polytechnique research center working on the frontier of knowledge on the major interdisciplinary scientific, technological and societal issues. Within the Teaching and Research Department of Ecole polytechnique, PMC is a mixed research unit (Ecole polytechnique/CNRS) whose work is organized around two fundamental topics that are the nanosciences and the physics of irregularity (for more details : https://pmc.polytechnique.fr/)</p>
Skills	<p>The candidate must hold a PhD in cold-plasma physics or in material science or chemistry with an experience in the field of cold plasmas. The candidate must be strongly motivated by the multidisciplinary aspect of the project in material science and chemistry.</p>
Supplementary information	<p>Applications must include CV, one reference (to be contacted) and a resume of the thesis Remuneration: ~ 2500 net/month for PhD + 0-2 years OR 3300 ~net per month for PhD 2-6 years Beginning date of the contract: From October 2022 to February 2023 Date of publication : 1st June 2022</p>