



Master 2 Research Fellow at LRCS, Amiens, FRANCE	
Synthesis of Macromolecules for Organic Batteries	
Principal Advisor	GOTTIS Sébastien, sebastien.gottis@u-picardie.fr, (+33) 3 22 82 57 95 TOUMIEUX Sylvestre, sylvestre.toumieux@u-picardie.fr, (+33) 3 22 82 74 76
Web Site of Advisor	https://www.lrcs.u-picardie.fr/equipe/permanents/detail/sebastien-gottis/ https://www.u-picardie.fr/labo/LG/personnel/Axe_C2D/Sylvestre_TOUMIEUX.php
Deadline for application	December 10 th , 2023
Date of start of the Project	February 1 st , 2024
Description of the Topic	<p>Over the past decade, lithium-ion batteries have garnered significant public attention, especially with the proliferation of portable and connected devices. The rapid evolution of secondary batteries, however, has brought forth concerns regarding the supply of inorganic raw materials. Organic materials and organic chemistry present compelling alternatives for creating battery electrodes for several reasons:</p> <ul style="list-style-type: none">(i) They are cost-effective and energy-efficient to produce.(ii) Organic chemistry offers a wide array of versatile reactions to generate the desired organic materials. <p>Despite these significant advantages, organic materials face challenges such as solubility in electrolytes and low conductivity, often necessitating the use of a substantial amount of carbon black in the electrode. One potential solution to overcome these drawbacks is the synthesis of macromolecular scaffolds incorporating electroactive functionalities.</p> <p>The objective of this master's thesis is to meticulously follow each stage of this highly innovative project, from synthesis to the final characterization of the battery. The master's student will be responsible for studying and fully characterizing the new organic macromolecules as electroactive materials for energy storage.</p> <p>For this project, the ideal master's student should possess a strong background in organic chemistry, with experience in polymer synthesis being a valuable asset. Proficiency in electrochemistry is also desirable. Applicants must demonstrate a high level of motivation and effective communication skills, both in written and spoken English. The ability to work both as a team member and independently is essential.</p>
Techniques to be used	<p>The new organic materials will be characterized in-depth by NMR, MS and TG-DCS and X-ray scattering.</p> <p>The electrochemistry will be performed with Cyclic voltammetry and Galvanostatic cycling to evaluate the ability of the materials to be used as reversible electrochemical redox compound vs Li⁺/Li.</p>
Skills of the Applicant	The student has to be in Master II in organic chemistry or organic materials chemistry and should show a strong motivation.
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List of documents to provide	CV + motivation letter + list of references + 2 recommendation letters Marks and ranking during your master degree

