



PhD Topic for Research at LRCS, Amiens, FRANCE https://www.lrcs.u-picardie.fr/	
Topic Title	Crystal Chemistry of Solid Electrolytes for All-Solid-State Batteries
Principal Advisor	MASQUELIER Christian, christian.masquelier@u-picardie.fr, +33662518972
Co-advisor	VIALLET Virginie, virginie.viallet@u-picardie.fr, +33322825333
Collaborations	CABELGUEN Pierre Etienne, UMICORE
Funding Source,	CIFRE convention between UMICORE & CNRS (LRCS in UPJV Amiens)
Web Site of Advisor	https://www.christian-masquelier.fr/
Date of publication of the offer	September 1 st , 2019
Deadline for application	October 1 st , 2019
Date of start of the Project	January 1 st , 2020
Description of the Topic	<p>The goal of this collaborative PhD work is to explore the crystal chemistry of inorganic ionic conductors to be used as solid electrolytes for Lithium based All Solid State Batteries, by exploring different synthesis routes and alternative compositions. A comprehensive study of transport and stability properties will be carried out in liaison with the structural features.</p> <p>Characterization techniques will include state-of-the-art X-ray diffraction, wide access to neutron and X-Ray Synchrotron facilities, SEM and TEM electron microscopy and electrical measurements from -35°C to 500°C. Temperature-controlled synchrotron X-Ray and neutron diffraction experiments will be used as additional essential techniques in order to probe order-disorder transitions and thermal motion factors. Further analysis of Li environments, local structural features and diffusion will use Raman spectroscopy and solid-state MAS NMR in collaboration with the RS2E NMR Platform. The solid electrolytes will be evaluated in All Solid State batteries.</p>
Techniques to be used	<ul style="list-style-type: none">✓ Mecano-synthesis, solid state synthesis and precipitation synthesis✓ X-ray and Neutron diffraction✓ Scanning Electron Microscopy and Transmission Electron Microscopy✓ Impedance spectroscopy✓ Electrochemistry
Skills of the Applicant	This internship requires skills in chemistry and/or physical chemistry with, ideally, a 1 st experience in battery & electrochemistry research. The candidate will have to show strong motivation and interest in working in a collaborative environment. The candidate must be rigorous, curious and ready for a nice challenge with an industrial partner.
Contact (s)	christian.masquelier@u-picardie.fr ; virginie.viallet@u-picardie.fr
List of documents to provide	CV + motivation letter + list of references + transcripts for the past two years