



Secteur des Sciences
et Technologies

Invitation à la soutenance publique de thèse de

Rico RUPP

Master ingénieur civil en chimie et science des matériaux à finalité spécialisée

Pour l'obtention du grade de Docteur en sciences

« New insights towards better Li and Na ion/metal batteries -
diffusion, plating and electrolytes »

qui se déroulera
le lundi 14 décembre 2020 à 10h
En visioconférence
1348 Louvain-la-Neuve

Jury members :

Prof. Alexandru Vlad (UCLouvain), supervisor
Prof. Arnaud Delcorte (UCLouvain), chairperson
Prof. Jean-François Gohy (UCLouvain), secretary
Prof. Luc Piraux (UCLouvain)
Prof. Jan Fransaer (KU Leuven, Belgium)
Prof. Leif Nyholm (Uppsala University, Sweden)
Prof. Mathieu Salanne (Sorbonne Université, France)



 UCLouvain

The direction, in which we go as a society, depends heavily on energy storage. As we approach the theoretically possible capacities, for example of graphite-based electrodes, we reach a bottleneck for the further improvement of batteries and the development of dependent fields. A shift towards new materials is therefore required. Apart from challenges of technical nature, the expected growth of the energy storage sector in the near future raises furthermore issues of ecological sustainability that have to be met.

This work focuses on the negative electrode of lithium ion batteries and so-called beyond lithium ion technologies, as well as the related interactions with the electrolyte. The first approach is a direct one, where we propose a new type of electrode architecture. The thereby encountered limitation in form of inept diffusion rates of lithium in copper, has implications for the general use of copper in lithium ion batteries. The diffusion is thus subjected to close investigation. This marks our second approach as a more fundamental one, focusing on uncovering underlying phenomena of the respective applications. The influence of often neglected parameters on the cycling of sodium metal as another type of negative electrodes is thoroughly studied. Building upon this base, we finally construct the principle of electrolytes that do not form a solid electrolyte interphase as a potential solution to many of the encountered issues. In the search for such an electrolyte, suitable analytical protocols are developed.