



Secteur des Sciences
et Technologies

Invitation à la soutenance publique de thèse de
Qi ZHU

Master degree in the discipline of Inorganic Chemistry

Pour l'obtention du grade de Docteur en sciences

«Bipolar electrode materials for lithium and sodium batteries»

qui se déroulera
le lundi 1 février 2021 à 10h
en ligne

Jury members :

Prof. Alexandru Vlad (UCLouvain), supervisor
Prof. Jean-François Gohy (UCLouvain), chairperson
Prof. Yaroslav Filinchuk (UCLouvain), secretary
Prof. Yann Garcia (UCLouvain)
Prof. Sorin Melinte (UCLouvain)
Prof. Bao-lian Su (Unamur, Belgium)
Prof. Rabah Boukherroub (University of Lille, France)



Today the world is witnessing a rapid technological development where electrical energy is considered as the driving force. In this context, clean energy that can be efficiently stored and supplied on demand constitutes the main challenge for the 21st century. Currently, our energy consumption is mainly relying on finite fossil fuels (coal, petroleum and natural gas) whereas renewable energy resources (solar, wind, biomass...) remain modestly explored due to the lack of efficient and environmentally benign energy storage solutions. So far, lithium-ion batteries are considered as the most realistic solution to empower all the technological sector, yet, with serious cost and environmental issues hanging over their extensive production.

Among other promising alternatives, symmetrical dual-ion batteries. To that extent, the topic of this thesis is focused on the identification and development of bipolar electrode materials able of being used as both positive and negative electrodes at the same time. Firstly, we explored the reactivity of nitrogen-doped carbon nanotube sponge at high potentials through anion insertion with the aim of developing a carbon nanotube-based dual-ion battery. Secondly, we studied the mixed cationic and anionic redox of Na_2MoS_4 and its electrochemical properties as bipolar materials toward the assembly of a symmetric inorganic battery.