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Sodium-Ion and sodium Metal BAtteries for efficient and sustainable next-generation energy storage

GRANT AGREEMENT No. 963542

SIMBA – Deliverable Report

<< D4.2 – Report on anode optimisation >>

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Publishable summary

The main goal of the SIMBA project is the development of a highly cost-effective, safe, all-solid-state-battery with sodium as mobile ionic charge carrier for stationary energy storage applications. Although in many ways SIBs are similar to LIBs, there are still a number of scientific and technical challenges to be addressed to understand electrochemical processes, the degradation mechanisms, and the cell manufacturing process. Furthermore, novel materials such as electrodes and solid electrolytes that can be manufactured economically in a large scale have to be developed, optimized and tested for application in SIBs. SIMBA aims to work on these challenges and pave the way to market introduction.

One of the key goals of the SIMBA project is the development of sustainable materials and electrode manufacturing to meet such requirements. Task 4.4 of WP4 focuses on the development and optimisation of anode materials. Activities target processing of materials into slurries including formulation development and coating for anode materials proposed in the SIMBA project.
Two types of anodes are examined, i.e., sustainable biomass-derived Hard Carbon (HC) in which sodium-ions are inserted, and a new porous ceramic framework allowing for sodium deposition in the pores, which are preferential sites for Na plating, ruling out the danger of dendritic battery short-cut.

This document outlines the activities related to deliverable D4.2 reporting on anode optimisation. The work associated to this deliverable is that of ST4.4.1 Slurry formulation development for both anodes. Partners including Elkem and IFE have successfully produced a total of 4 kg of HC over the course of the project. Such material has been implemented in slurry formulations carried out in WMG examining its processability. On the other hand, TUDa and SAS focused on the development of light-weight silicon carbonitride and silicon oxycarbide ceramics processed at a lab scale level.

7. Appendix B - Disclaimer/Acknowledgement

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 963542. The information and views set out in this publication does not necessarily reflect the official opinion of the European Commission. Neither the European Union institutions and bodies nor any person acting on their behalf, may be held responsible for the use which may be made of the information contained therein.