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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

D2.2 – Optimized hard carbon tested at coin cell level

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Publishable summary

The main objective of the task is to develop biomass-derived hard carbon anode materials for Na-ion batteries. First, this is to be achieved by identifying the appropriate bio-precursor. Such precursors should be available at a large scale to ensure scalability of the technology, cost and sustainability. Thus, IFE tested and screened different carbon sources via pyrolysis and structure characterisation as well as electrochemical performances. Second, the selected precursors (lignosulfonate and spruce sawdust) were further optimised either for better electrochemical performance or more efficient synthesis conditions. The optimisation of the hard carbon involved several steps to provide a controlled morphology and microporosity of the final product both of which dictate the electrochemical performance of the material. These optimisation steps include heat pre-treatment of the precursor, pyrolysis, and annealing of the produced hard carbon materials.
Last, the formulation for the anode fabrication is to be optimised. Specifically, the ratio between hard carbon, conductive additives and binder is optimised to ensure that the final electrode meets the specifications. In this subtask, the successful integration of the SIPE electrolyte with the developed hard carbon will be evaluated at an electrode level to ensure the compatibility of the two chemistries. The hard carbon to SIPE ratio will be optimized to ensure chemical and electrochemical stability at the hard carbon/SIPE interface.