

**EUROPEAN COMMISSION**

HORIZON 2020 PROGRAMME - TOPIC H2020-LC-BAT-2020  
Sodium-Ion and sodium Metal BAtteries for efficient and sustainable  
next-generation energy storage

GRANT AGREEMENT No. 963542



SIMBA – Deliverable Report

<< D4.6 – Demonstration of sustainable binder system  
for cathodes and anodes >>

Deliverable No.	SIMBA D4.6	
Related WP	WP4	
Deliverable Title	Demonstration of sustainable binder system for cathodes and anodes	
Deliverable Date	30-06-2023	
Deliverable Type	REPORT	
Dissemination level	Confidential – member only (CO)	
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Status	Draft 1.0	2023-06-30



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 963542.

## Publishable summary

CMC/SBR system is the most studied and used water-based binders in electrode manufacturing, which is also selected as the standard binder in the SIMBA baseline cells (BLCs). As a synthetic rubber that is derived from styrene and butadiene, SBR (Styrene-Butadiene Rubber) would preferably be replaced by more ecofriendly and greener binders for a sustainable battery system. This document provides a demonstration of sustainable water-based biopolymers as binders applied in the electrodes, both cathode and anode that are used in BLCs. This work is carried out in collaboration with WP6 to investigate the design for cell recycling, purifying materials waste streams at End of Life (EOL). Three biopolymers, Guar, Carrageenan Iota, Carrageenan Kappa, have been selected and studied with both Prussian White (PW) cathode and Hard Carbon (HC) anode. Compared with the standard CMC/SBR binder system that has been used in BLCs, Guar and Carrageenan Iota give comparable or even better results on various features, such as rheology, manufacturability, adhesion properties, conductivity, capacity and cycle stability. Different characterizations have been carried out to understand the binding mechanisms of these biopolymers. This study will provide possibilities to process electrodes with sustainable binders into SIMBA BLCs.