

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

<< D1.5 – Full process flow of material, manufacturing,
reclamation and repurposing >>

Deliverable No.	SIMBA D1.5	
Related WP	1	
Deliverable Title	Full process flow of material, manufacturing, reclamation and repurposing	
Deliverable Date	2024-06-27	
Deliverable Type	REPORT	
Dissemination level	Confidential – member only (CO)	
Written By	Farouk Tedjar (TES) & Zijun Lu (TES)	2024-06-24
Checked by	Piter Miedema (UNR)	2024-06-27
Reviewed by (if applicable)	Jonas Welch Arjo Roersch van der Hoogte	2024-06-26 2024.06.27
Approved by	Ralf Riedel (TUDa)	2024-06-29
Status	Final	2024-06-29



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

Publishable summary

This deliverable, titled "Full Process Flow of Material, Manufacturing, Reclamation, and Repurposing," outlines the development of recycling processes for SIMBA cells, including baseline cells with liquid electrolytes (BLC) and solid-state cells with solid electrolyte membranes (SSC). The objectives are to design efficient mechanical-sorting and hydrometallurgical processes for SIMBA cells and assess their adaptability for commercial sodium-ion batteries (SIBs).

The mechanical-sorting processes involve shredding, drying, and separating materials to isolate active components and aluminium. For SSCs, additional steps handle the solid electrolyte membrane. The hydrometallurgical process reclaims active materials from both BLC and SSC, involving leaching, crystallization, and purification steps. SSCs require an additional dissolution process using specific solvents.

Tests indicate the mechanical-sorting process can adapt to recycling commercial SIBs, though the hydrometallurgical process needs adjustments for different cathode materials. These processes achieve high recycling yields, minimize wastewater emissions, and reduce energy consumption, supporting sustainable battery recycling and the circular economy.

Appendix B- Acknowledgement

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Project partners:

#	Partner	Partner Full Name
1	TUDa	TECHNISCHE UNIVERSITAT DARMSTADT
2	UU	UPPSALA UNIVERSITET
3	UBham	THE UNIVERSITY OF BIRMINGHAM
4	WMG	THE UNIVERSITY OF WARWICK
5	KIT	KARLSRUHER INSTITUT FUER TECHNOLOGIE
6	CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
7	IFE	INSTITUTT FOR ENERGITEKNIKK
8	SAS	USTAV ANORGANICKEJ CHEMIE SLOVENSKA AKADEMIA VIED (Institute of Inorganic Chemistry, Slovak Academy of Sciences)
9	FHG	FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
10	Elkem	ELKEM AS
11	YUN	YUNASKO-UKRAINE LLC
12	SAFT	SAFT
13	Altris	ALTRIS AB
14	Recupyl	TES RECUPYL SAS
15	UNR	UNIRESEARCH BV

Appendix C – Disclaimer/Acknowledgement



Copyright ©, all rights reserved. This document or any part thereof may not be made public or disclosed, copied or otherwise reproduced or used in any form or by any means, without prior permission in writing from the SIMBA Consortium. Neither the SIMBA Consortium nor any of its members, their officers, employees or agents shall be liable or responsible, in negligence or otherwise, for any loss, damage or expense whatever sustained by any person as a result of the use, in any manner or form, of any knowledge, information or data contained in this document, or due to any inaccuracy, omission or error therein contained.

All Intellectual Property Rights, know-how and information provided by and/or arising from this document, such as designs, documentation, as well as preparatory material in that regard, is and shall remain the exclusive property of the SIMBA Consortium and any of its members or its licensors. Nothing contained in this document shall give, or shall be construed as giving, any right, title, ownership, interest, license or any other right in or to any IP, know-how and information.

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.