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## **Era-Min Project RecyLIB**

**Direct Recycling of Lithium-Ion Batteries** 

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# RecyLIB



ERA-MIN has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 101003575 (ERA-MIN3)





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## RecyLIB

**Key facts** 

**Project Title:** RecyLIB (Direct Recycling of Lithium-Ion Batteries) Call: EU co-funded ERA-MIN Joint Call 2021 **Topic:** Recycling and Re-use of End-of-Life products and assets

**○ Total Budget:** 1 148 888 € **⊙** Total Requested Funding: 937 210 € **Duration:** 36 months, 01.05.2022 – 30.04.2025

**Coordinator:** Fraunhofer Institute for Silicate Research ISC **℃ Consortium:** 6 partners, 3 countries





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### **RecyLIB** The RecyLIB consortium







<sup>1</sup> https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\_de
https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/689337/EPRS\_BRI(2021)689337\_EN. pdf
<sup>3</sup> https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:52020DC0474&from=EN
<sup>4</sup> https://www.responsiblebatterycoalition.org/rbc-argonne-national-laboratory-partner-on-advanced-design-recycling-programs-for-new-battery-technologies/

 $\odot$  Global warming and environmental degradation are serious challenges facing society in the 21st century

 $\odot$  Measures: European Green Deal<sup>1</sup> ( $\rightarrow$  Europe first climate neutral continent by 2050) and Battery Directive<sup>2</sup>

Batteries (e.g. Lithium-ion batteries (LIBs)) are considered as a key technology

 $\bigcirc$  Increasing demand for batteries  $\rightarrow$  increased number of spent batteries

 $\odot$  Critical raw materials<sup>3</sup> as Lithium, Cobalt, Graphite needed for LIB fabrication

Improve sustainability of LIB manufacturing process

Battery recycling is essential (Increase resource efficiency, strengthen circular economy) verbrauchten EV-Batterien

Prognostiziertes globales Volumen an



RecyLIB



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#### RecyLIB **Objectives of RecyLIB**

Establish a sustainable, low-energy, high performance and highly efficient manufacturing and recycling chain for Lithium-ion batteries

Replacement of toxic solvents in the cathode manufacturing process



Recovery of electrode materials with a high yield using low energy and low CO<sub>2</sub> emission processes via a direct recycling approach



Use of up to 25 wt% of recycled electrode material in the electrode manufacturing process without having detrimental effects on the cell performance





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#### **RecyLIB** Overview of the RecyLIB activities



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#### RecyLIB

#### Mid to long term expected impact of RecyLIB

↔ Alternative eco-friendly cathode production route to minimize the use of N-methyl-2-pyrrolidone (NMP)

• Demonstration of the recovery of electrode materials with a high yield using low energy processes

- $\odot$  Strengthening the raw materials circular economy in the European battery industry
- $\odot$  Reducing the dependency of battery materials manufacturers on foreign critical raw materials





# Thank you for your attention!

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