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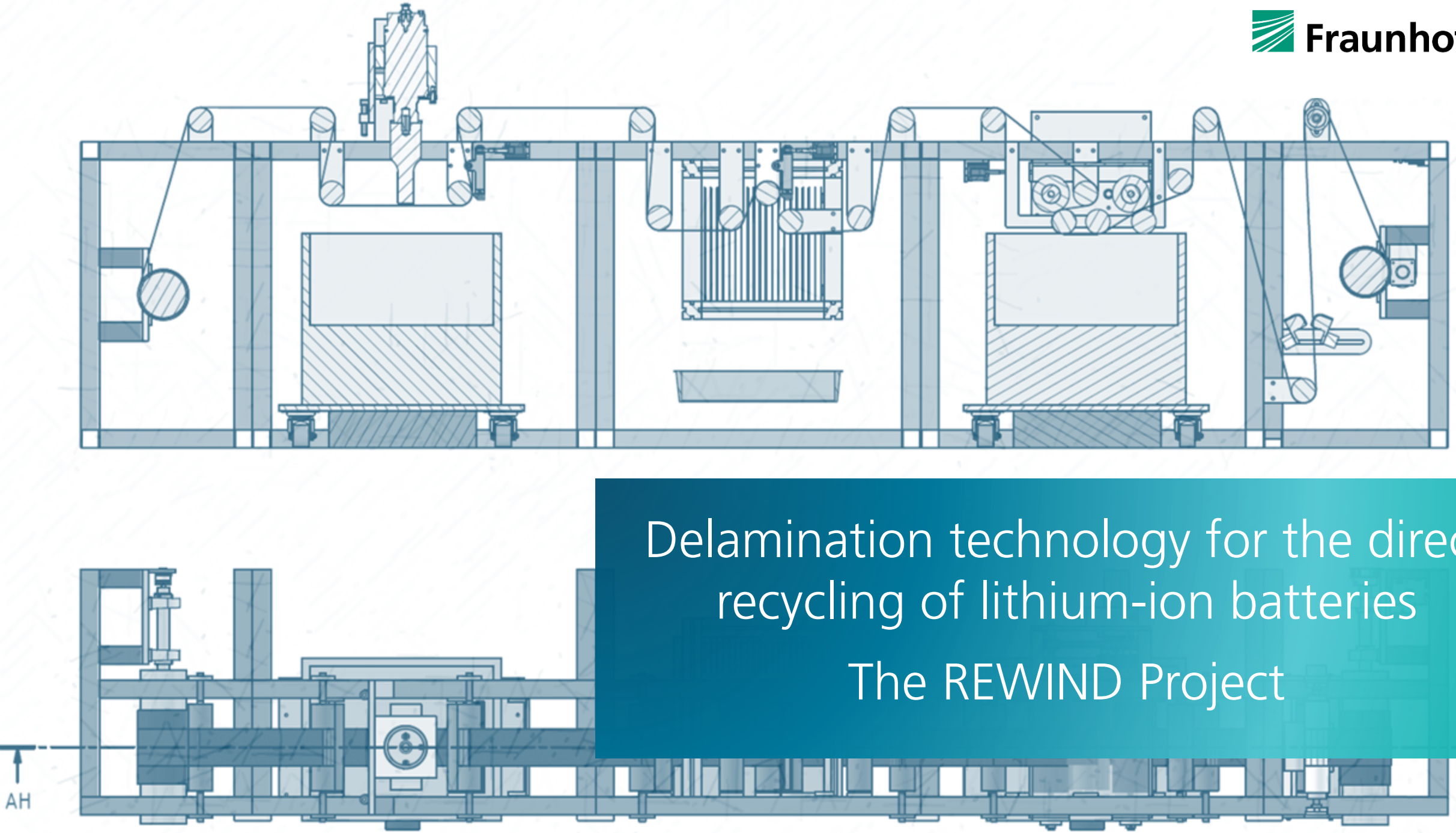
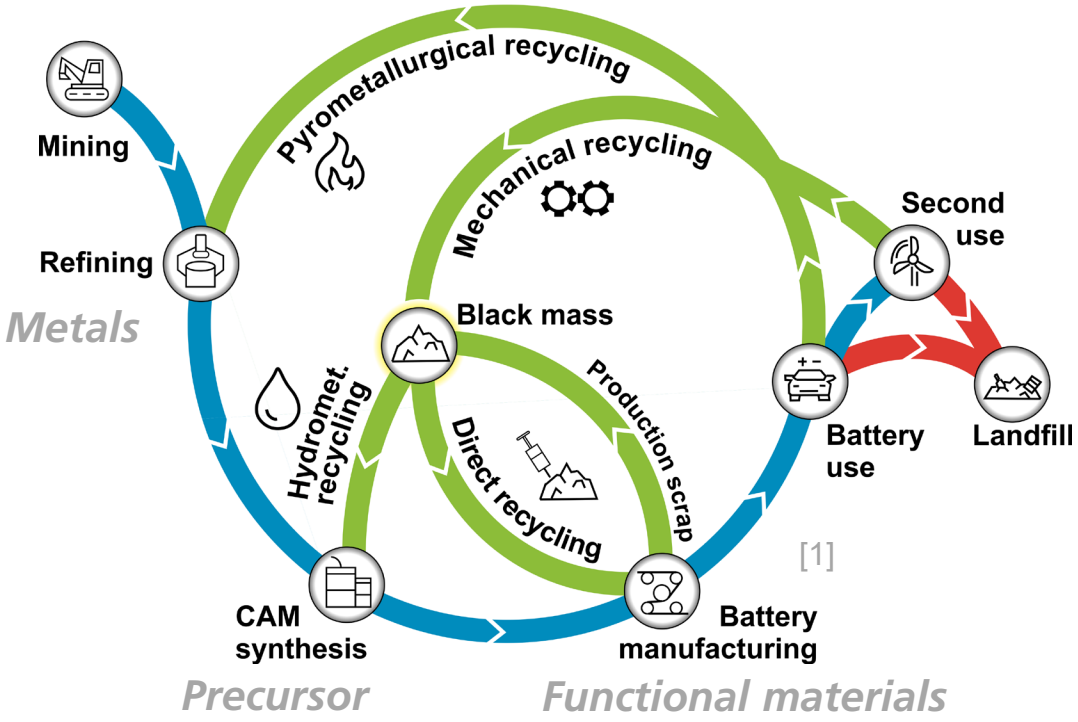


Delamination technology for the direct recycling of lithium-ion batteries

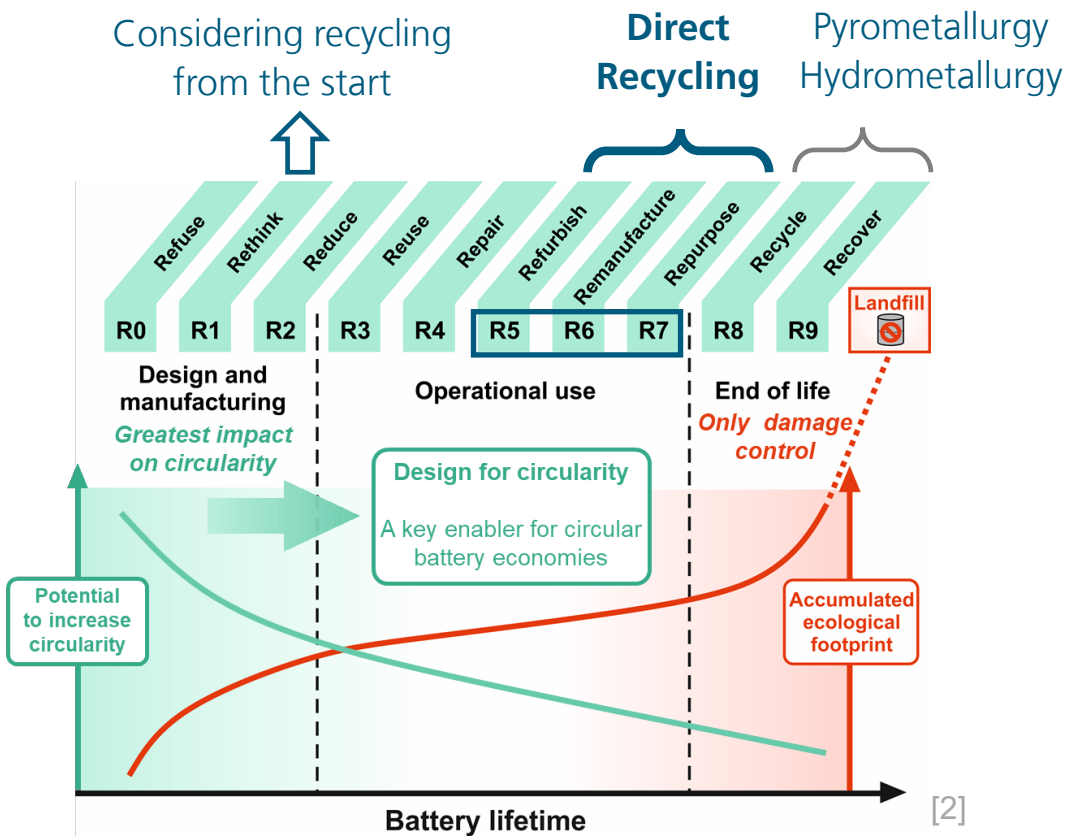
The REWIND Project

Circular economy for batteries – A Key Technology in the High Tech Agenda

Design for circularity enables direct recycling



[1]



[2]

Direct recycling: the recovery, regeneration, and reuse of battery components directly without breaking down the chemical structure.

„Design for Circularity" for future batteries enables or simplifies direct recycling

[1] Adapted from Gaines, L.; Dai, Q.;'Vaughey, J.T.; Gillard, S. Direct Recycling R&D at the ReCell Center. Recycling 2021, 6, 31.

[2] Andreas Wolf et al., Circular battery design: investing in sustainability and profitability, Energy Environ. Sci., 2024, Advance Article (DOI:10.1039/D4EE03418J)

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Vision of Fraunhofer ISC: Direct Recycling Transfer Center

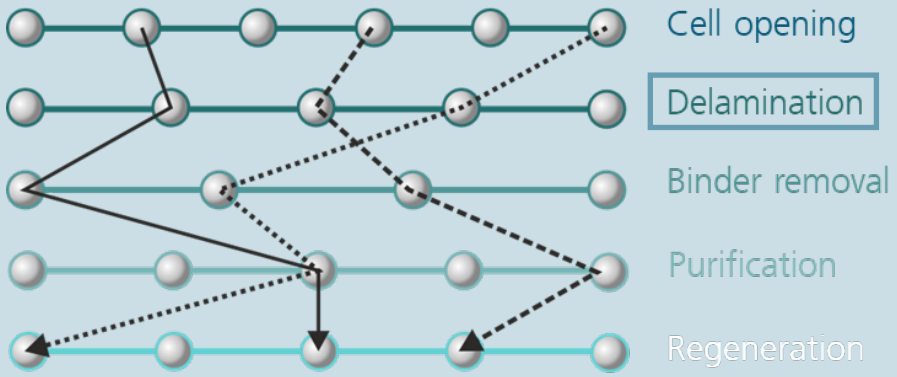
Cell manufacturer

User

Training, occupational safety and specialists

Tailor-made route for production scrap

Direct recycling processes



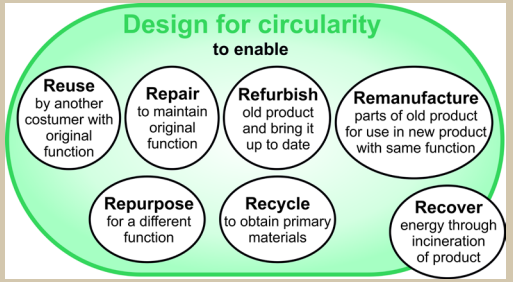
Recycler

New process steps

Plant & machinery manufacturers

Validation of machines

Design for Circularity



Critical points identified / new regulations

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Coating detachment as a key step in direct recycling

Lab scale

Pilot scale

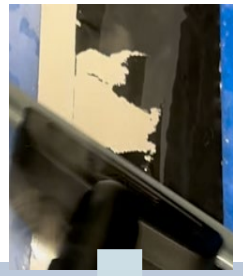












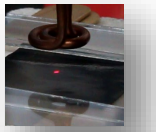


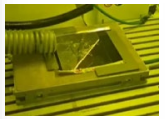
Dry processes

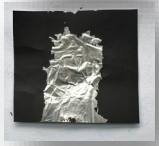


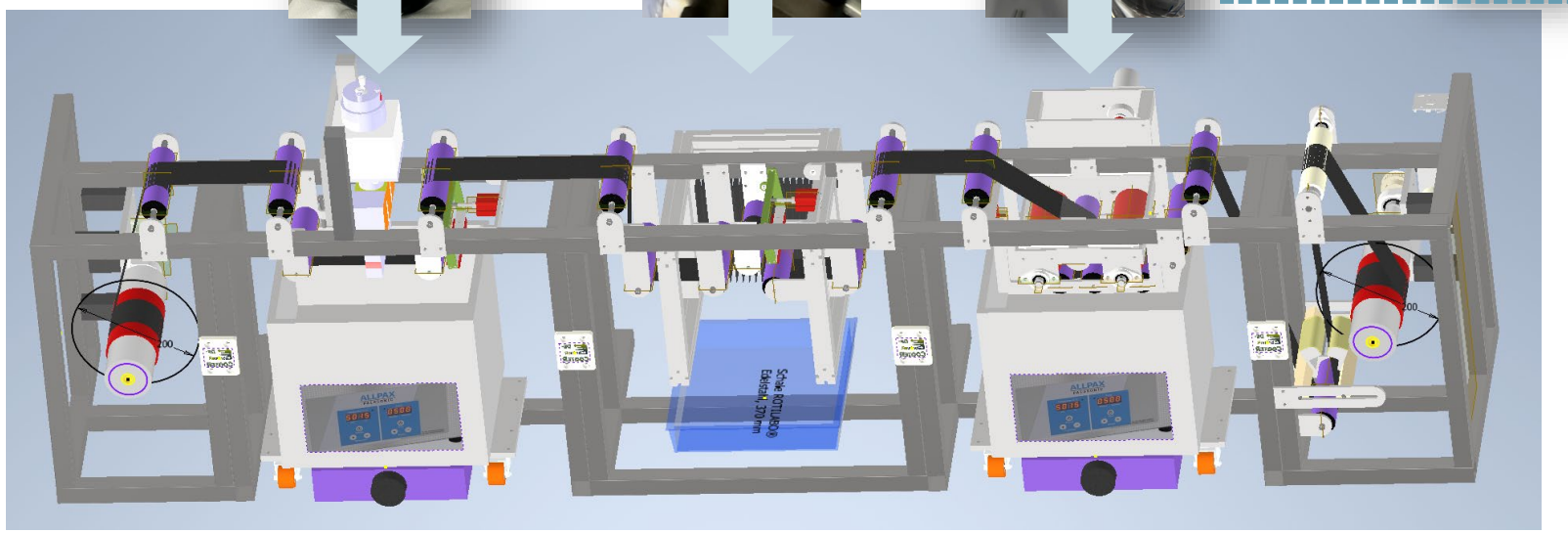




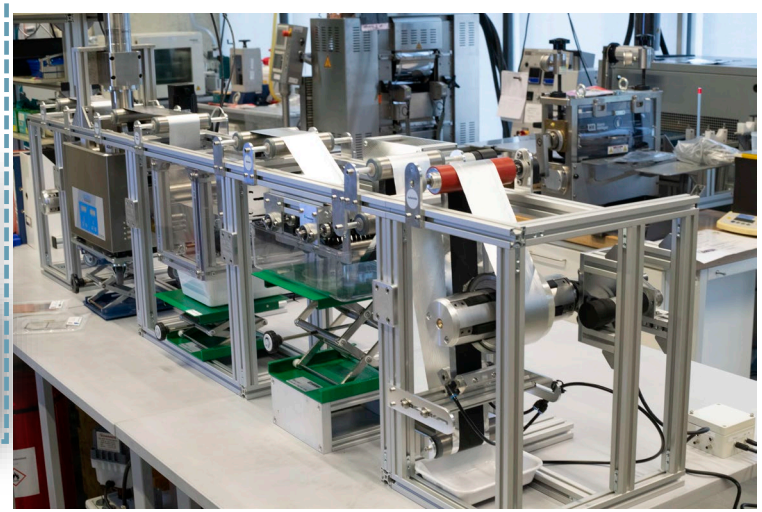


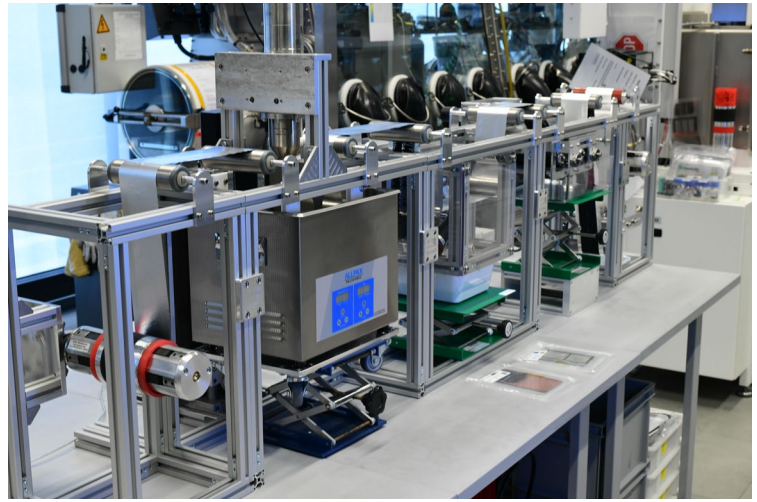






Modular delamination plant





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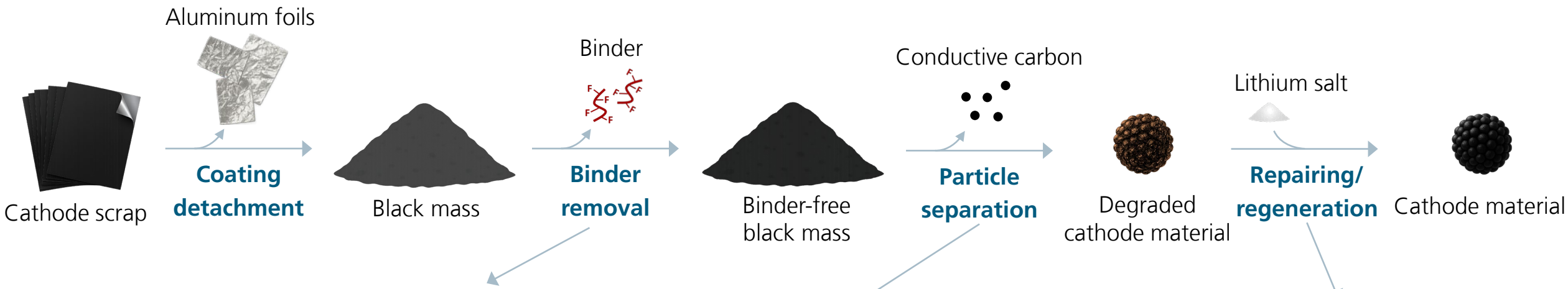
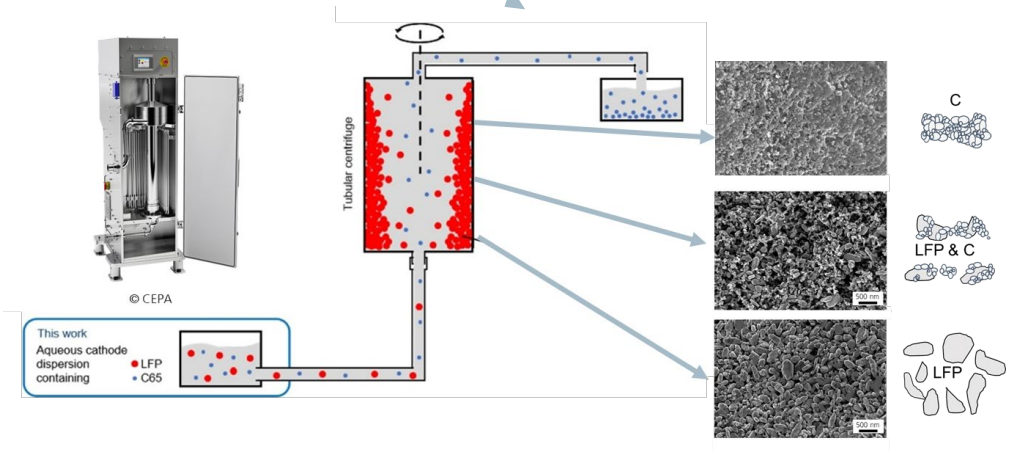
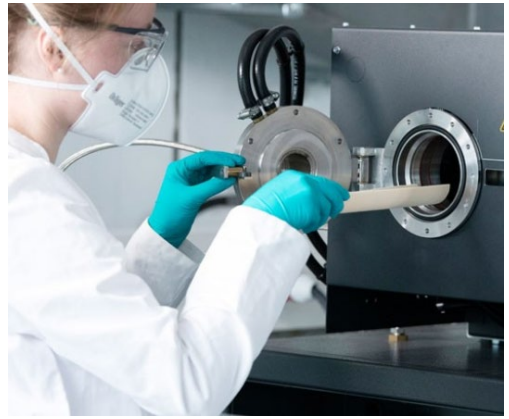
Further possible steps after coating delamination









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