CompoRec – a research project initiative on full material recycling of thermoset composites

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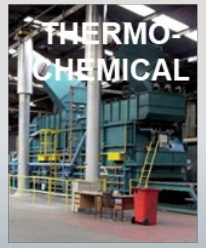
Lujitemuoviseminaari 6.11.24 Pietarsaari

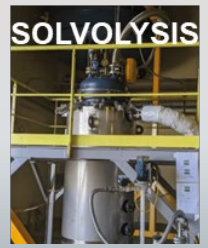



State-of-the-art composite recycling

- Use of composite waste in cement production, TRL 9
- First-of-a-kind process, KiMuRa, in commercial operation **2022-**
- Pioneering plant by Mirka, abrasives recovery via combustion **2025**

- Effective and low energy input, TRL 6-7
- Short fibre thermoplastic recyclates can be used as such
- Thermoset recyclates as fillers
- Not suitable for abrasive solutions





- Material recycling avoiding extensive downgrading
- Retains functional filler value
- Thermochemical TRL 6-9, Solvolysis TRL 4-5
- Fibre properties still lack, further development needed
- Sidestream utilization models lacking

Filler value retention

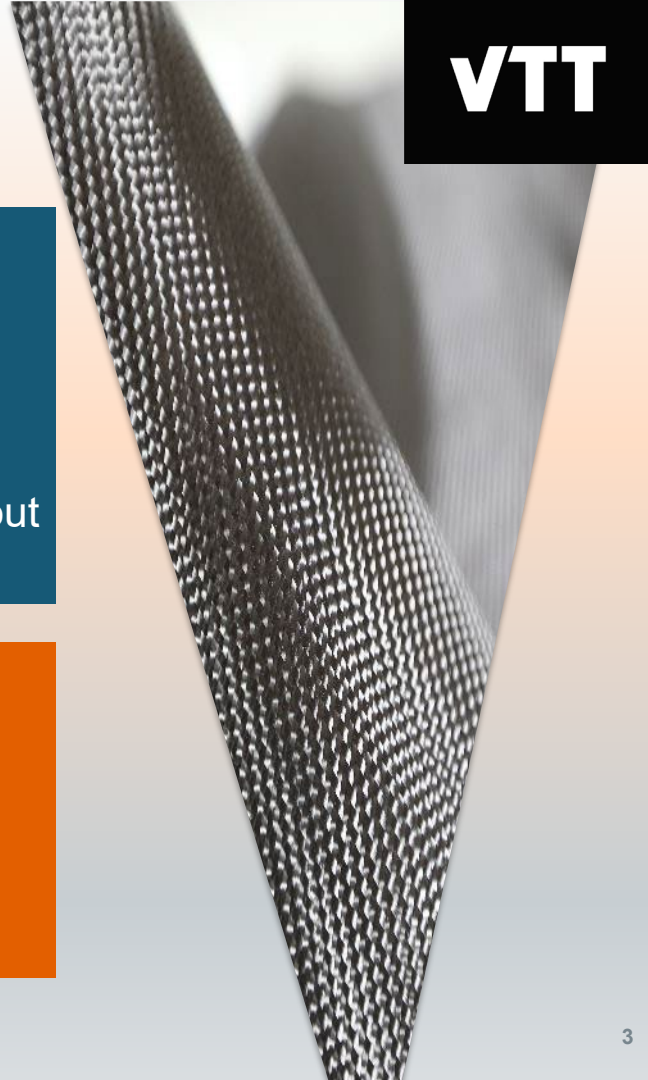
Challenges and needs

Challenges

- Truly circular solutions for recycling of composites are lacking
- Existing and upcoming EU recycling regulations are posing a risk to composite producers
- High value of reinforcements components are lost without truly circular recycling

Needs

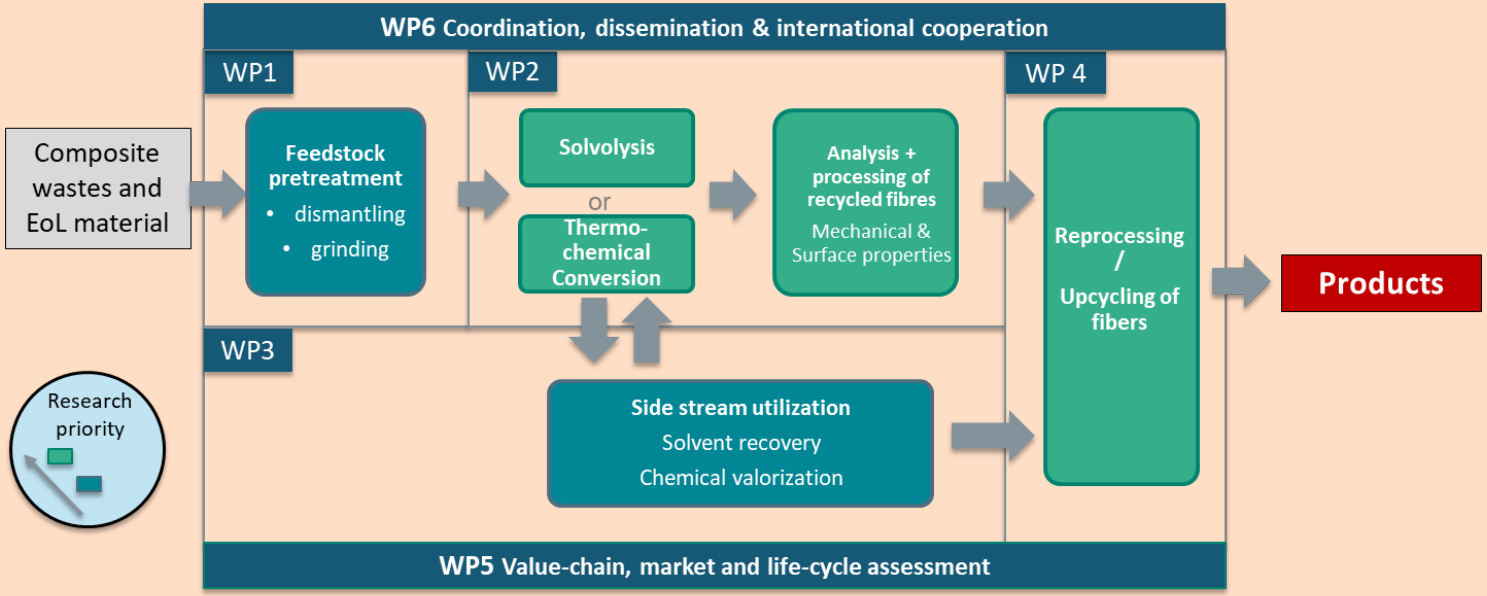
- Need for sustainable end-of-life solutions of high-performance thermoset composites
- Create an ecosystem to keep valuable materials in the loop and improve self-sufficiency in raw materials in Finland



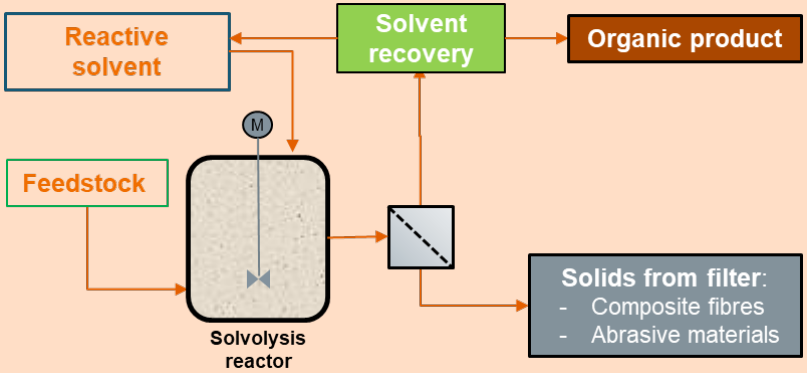
Comporec – Objectives and the main research questions

Main objectives of Comporec co-research project:

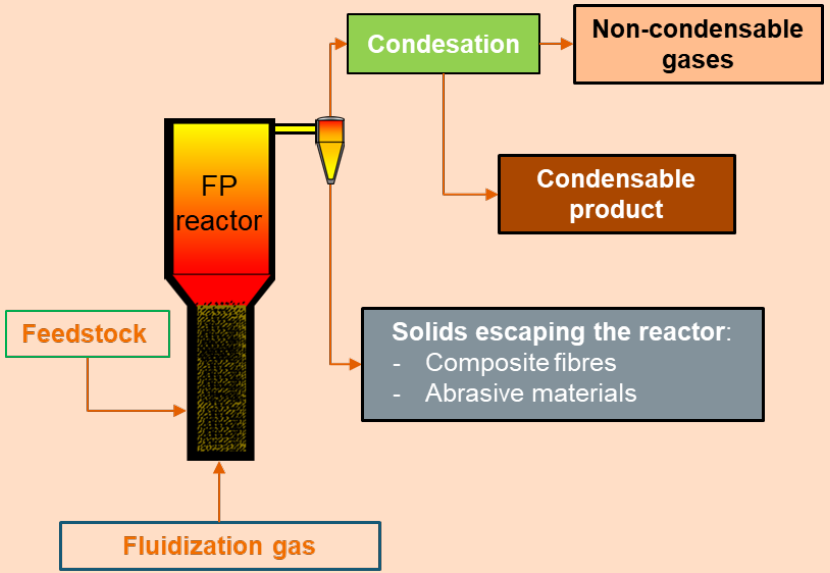
1. Demonstrate scalable and robust recovery and re-use of functional fillers from abrasives and CF composites at TRL 3-4
2. Generate relevant understanding on pretreatment of the feedstock and chemical recycling of the matrix resins



Chemical recycling process alternatives



Solvolysis

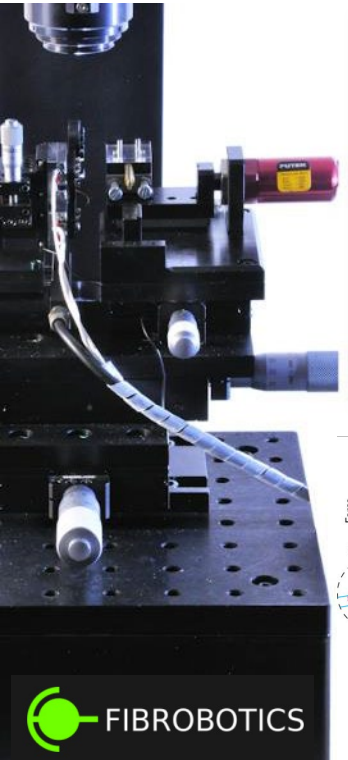


Fast pyrolysis

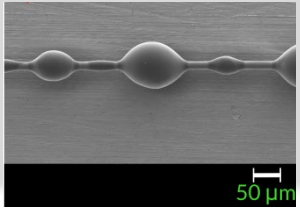
VTT

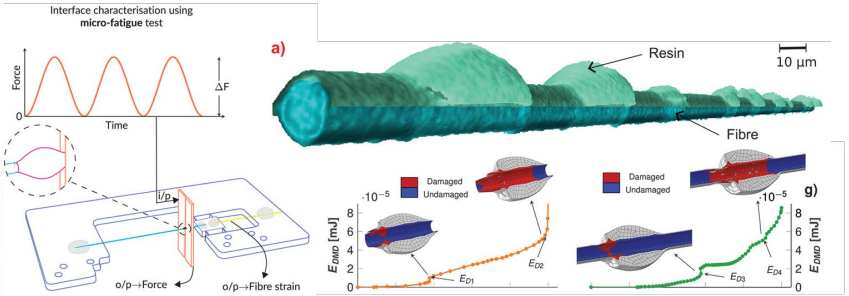
Characterization of composites at micro scale at Tampere University

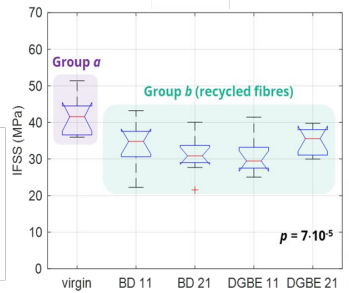
Tampere University



- State-of-the-art micro-scale mechanical test device
- Analysis of single fibres (filaments) and the fibre/matrix interface; quasi static or dynamic
- Thorough academic analysis of the samples, the device and the test modes reported







FIBROBOTICS

Proposal preparation timeline

VTT

1st presentation to BF, 2023

1st CompoRec workshop 6.2

Moved to a co-research

Discussions with companies

2nd CompoRec workshop 9.10

Consortium meeting with BF

Proposal submission DL 30.3

Co-research Project start

2023 | Q1/2024 | Q2/2024 | Q3/2024 | Q4/2024 | Q1/2025 | Q2/2025

First contacts to companies

First version of project plan

Consortium expanded with TAMK

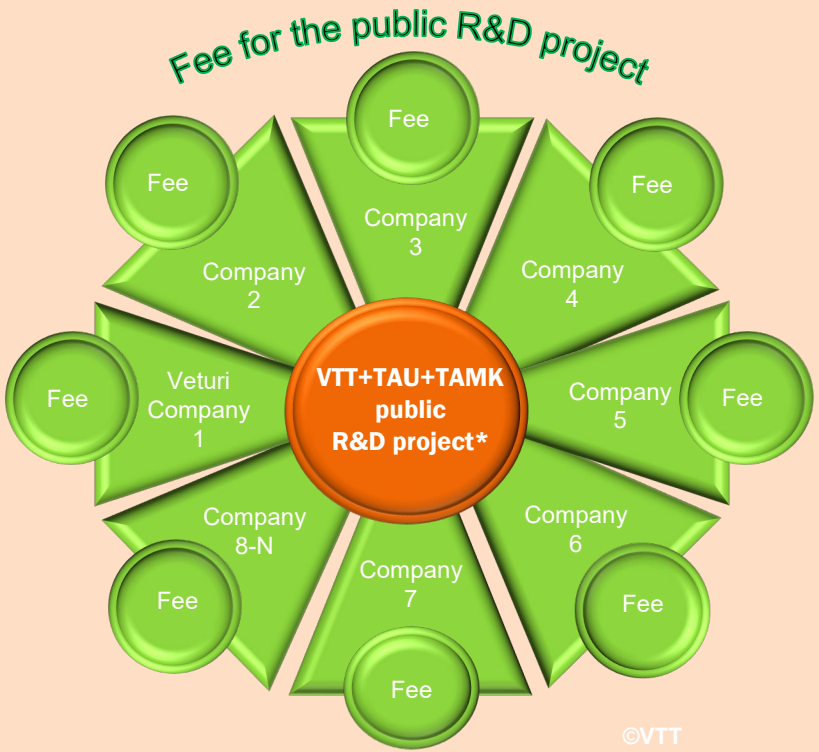
Discussions with companies

Project plan and application ready

Business Finland decision

Co-Research - Business Finland

VTT



Consortium and international collaboration

- Only available through specific BF funding calls 2-3 times a year.
- Several companies form a consortium around a common theme. Both small and large companies from should be involved.
- In the consortium: At least 6 companies and 1-3 research organizations. 30.3.2025 call requires a “Veturi company”
- Project must include international cooperation on the topic with another cutting-edge research organization.
- Companies participate in the project planning, steer the project via steering group work and join with the fee. No industrial parallel projects.
- The share of the company funding must be 10 % or more.
- Further benefits are strong networking and collaboration between companies in the consortium and public visibility

Participation fees for a 2 years project

Large: 50 k€ (>300 MEur turnover)
Medium: 40k€ (50-300 MEur)
Small: 14 k€ (10-50 MEur)
Micro: 6k€ (<10 MEur)

*Public R&D project financing from BF (60%), VTT/Universities (20-30 %) and companies (min 10 %)

Thank you!

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