Catack-H

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Closing the Loop with Sustainable Carbon Fiber

via Solvolysis

https://catack-h.com/

Blog.naver.com/catack-h

82-31-352-2455

Founded in 2017

by Dr. *Jin-Ho Jeong*

- Factory size: 6,000sqm
- Company size: 40 employees
- *CFRP-Recycling & Compounding*

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Carbon Fiber Composites Market

Carbon Fiber: Light-weight. High-strength.

Promise: Key component to achieve a **Sustainable** and **Circular Economy**

Conventional Markets

Automotive

Aerospace

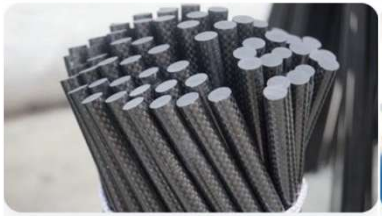
Sports / Leisure

Medical

Emerging Markets

High-pressure Vessels

Defence



Construction

Wind Blades

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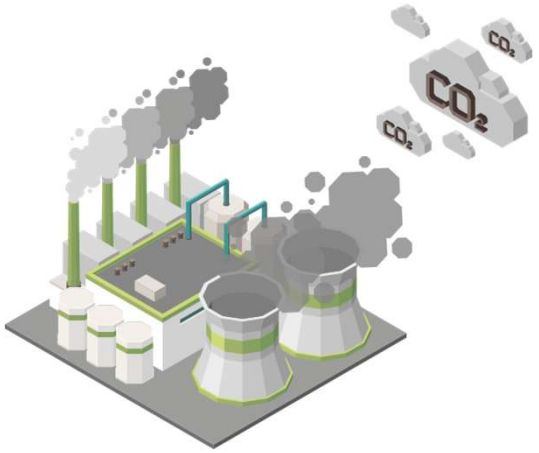
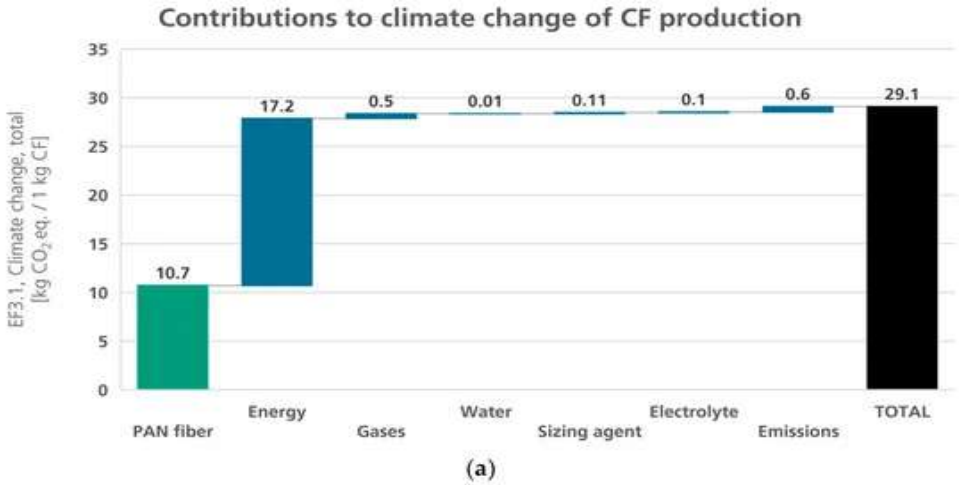
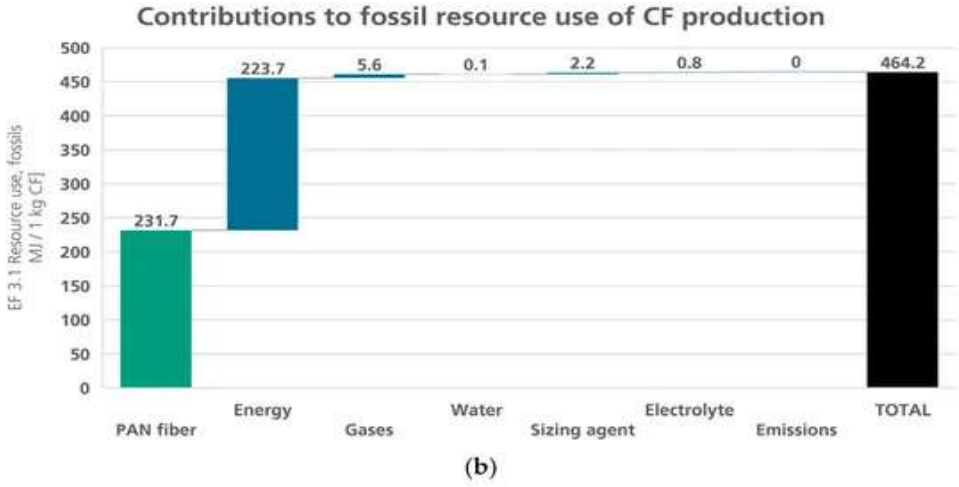
Problem 1

Energy-intensive Carbon Fiber Production





(a)



(b)

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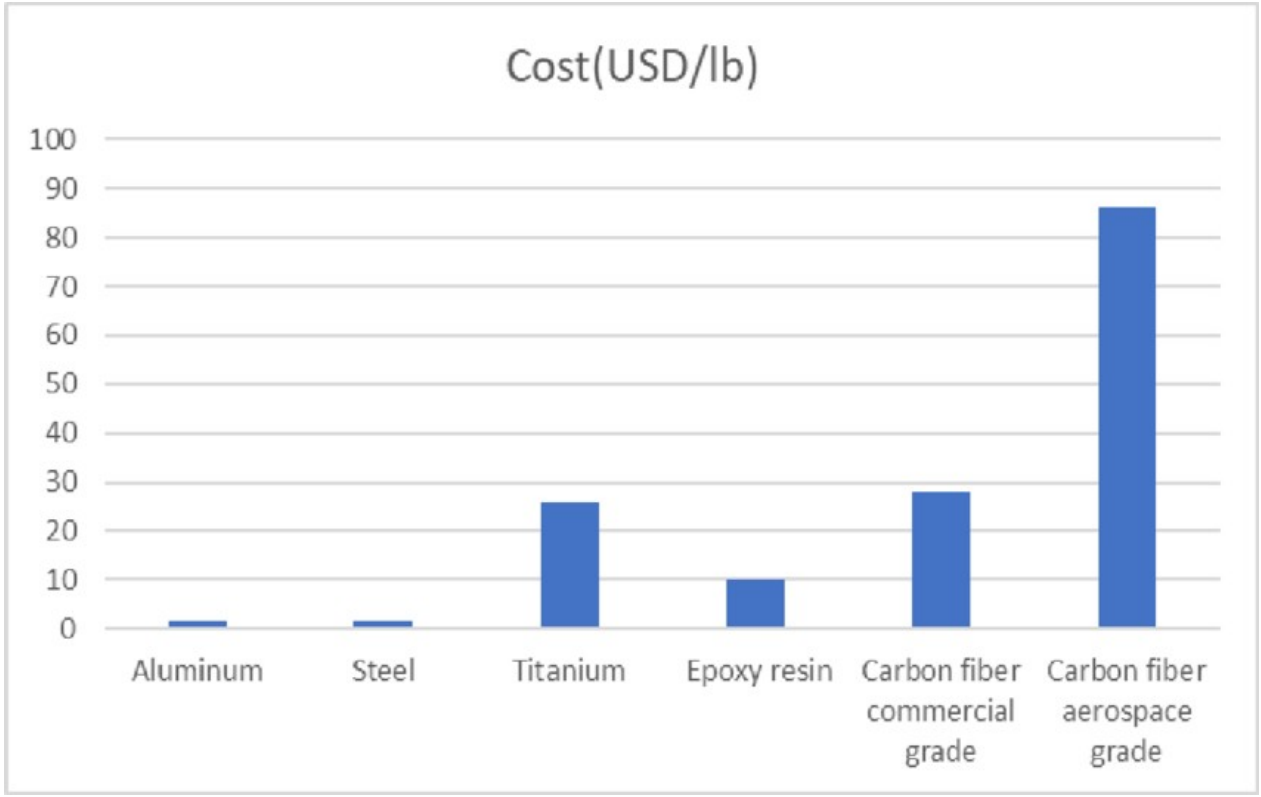
Problem 2

High Cost of Carbon Fiber compared with other building materials



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Problem 3

Waste Production

Post-Industrial: 30%=~40k MT/year

Post-Consumer: 300-400k MT/year

Dry fiber waste

Cured waste

Prepreg waste

End-of-life-waste

- loss of resource

- strict regulations

- not environmentally friendly

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Solution: Recycling

Requirement for Recycling

> Send your waste to a recycler, not the landfill!

Recycling **captures** the **energy** and **cost** embedded in CF

Eco-Friendly: No extra Waste & Low Energy

Positive Cost-Benefit and Life-cycle

High-Quality Product at **Competitive Price**

Be **circular**!

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Various Recycling Technologies

Mechanical

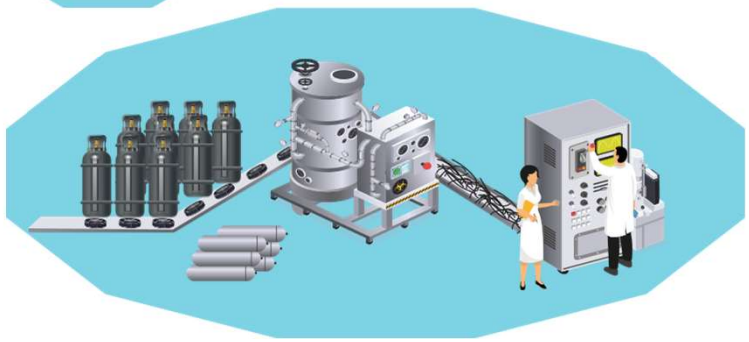
-> low quality

Thermal (Pyrolysis)

-> only fibers recovered

Chemical (Solvolysis)

-> **full circularity**



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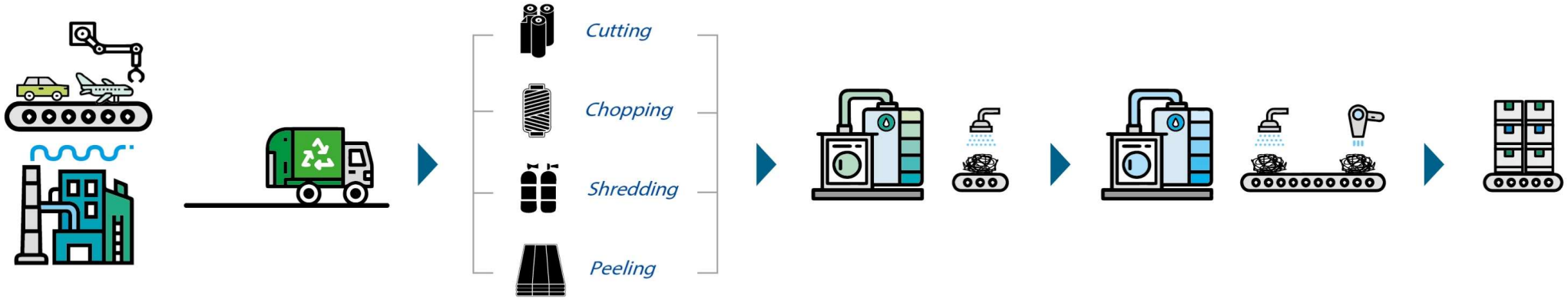
Catack-H's Recycling Solution

Optimal conditions due to unique Solvent Formulation:

- Low temperature (<100℃), Atmospheric pressure
- Short processing time (2-4 hours)



Scrap Collection → Sorting & Size Control → 1st Chemical Reaction & Washing → 2st Chemical Reaction, Washing & Dryiing → Packaging

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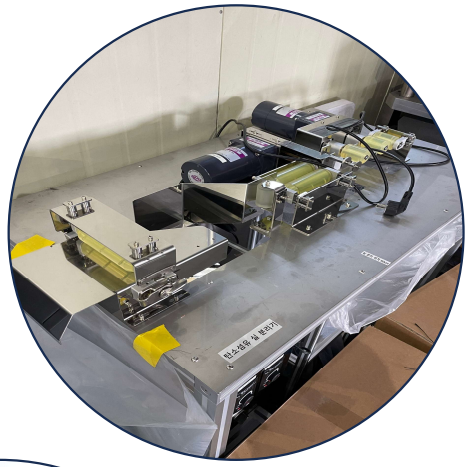
Current Facility




Catack-H's Recycling Advantages 01: Zero Waste

Eco-friendly Recycling

- Carbon Fiber & Resin recovery
- Reuse of waste solution

Waste Chemical

Filtration

Resin Residue

PU polymerization

PU foam

VE (vinyl ester)

VE Rebar, Rock bolt

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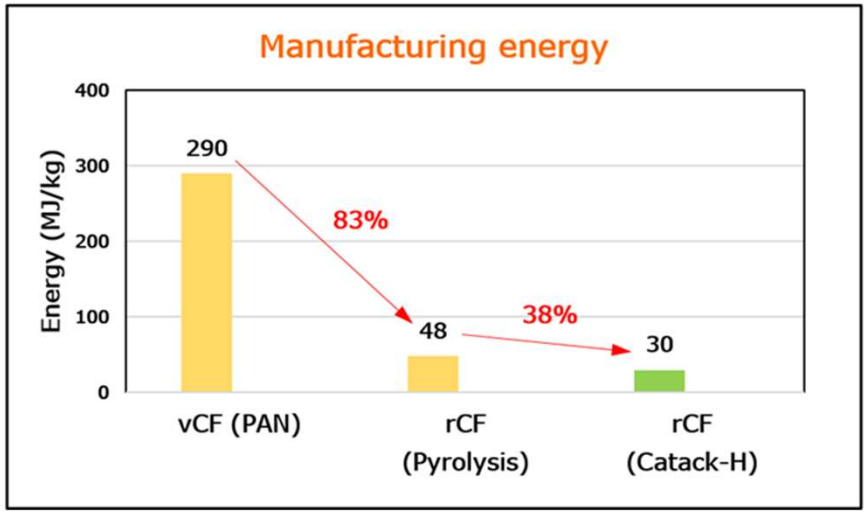
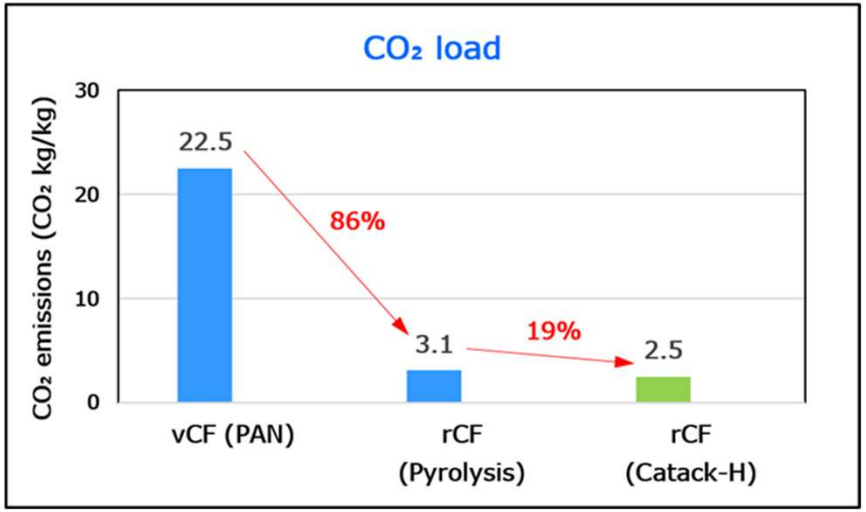
Catack-H's Recycling Advantages: 02

Low Energy Use

- Energy & CO_2 Reduction compared with vCF
- Energy consumption cost: 90% reduction
- CO_2 emission : 90% reduction





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Catack-H's Recycling Advantages: 03

Low Cost:
<75% compared with vCF

Target Production Price

5USD

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Catack-H's Recycling Advantages: 04

High Quality

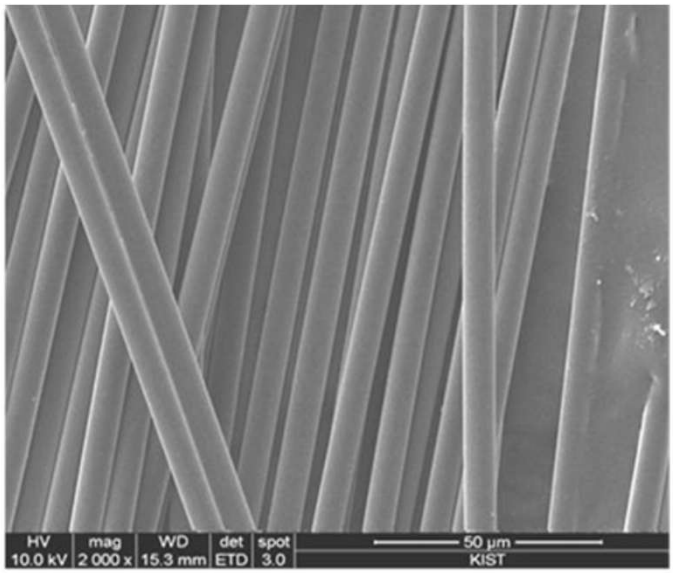
>95% mechanical properties (compared with virgin CF)

01 Catack-H's recycling technology produces high-quality rCF

02 No residues or impurities on fiber surface

03 High mechanical properties and electrical conductivity

04 Easy Processability for compounding or textile fabrication



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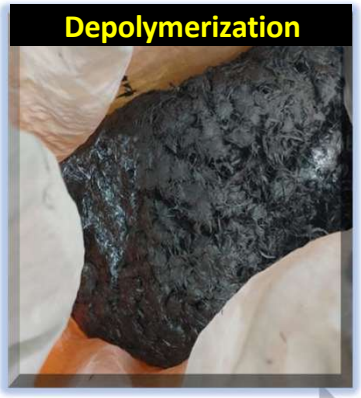
Carbon Fiber Recovery from EoL: Discontinuous

>> Aerospace scrap



Tensile strength (MPa)	Modulus (GPa)	Elongation (%)
4988 ± 483	280 ± 36	1.76 ± 0.17

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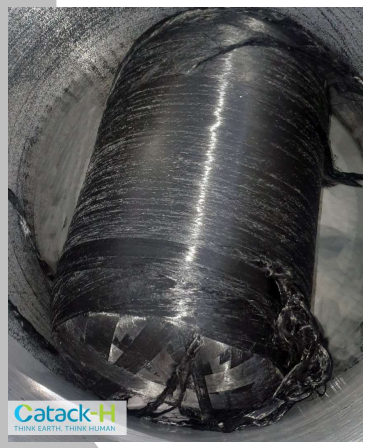
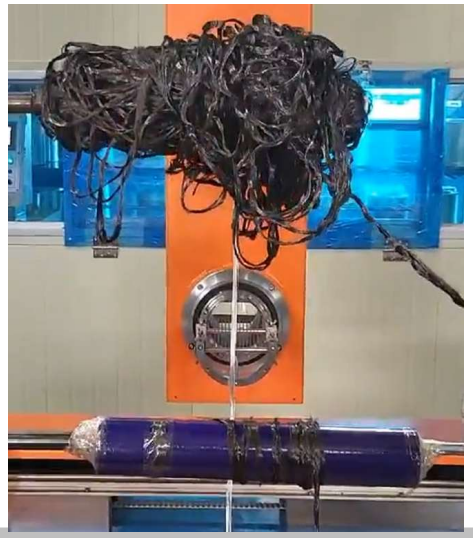
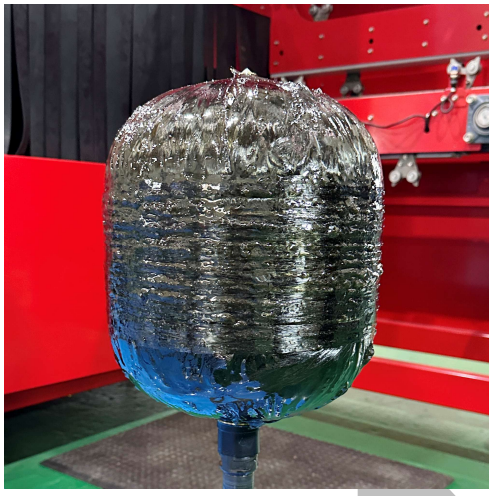
Carbon Fiber Recovery from EoL: Continuous!!!

>> Pressure Vessels: Full Circularity







Tensile strength (MPa)	Modulus (GPa)	Elongation (%)
5256 ± 700	267 ± 18	1.86 ± 0.24

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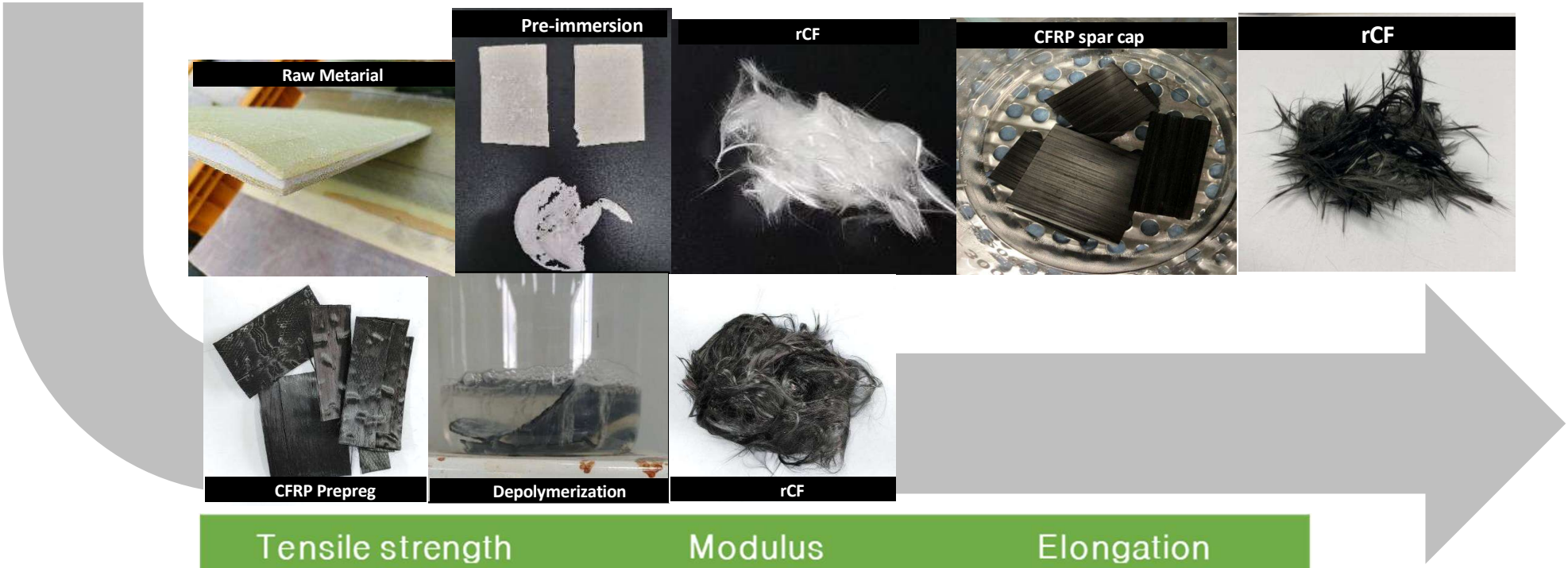
Feasibility Project

>> Wind Turbine Blades : GFRP + CFRP



Tensile strength (MPa)	Modulus (GPa)	Elongation (%)
4717 ± 733	233 ± 28	1.83 ± 0.27

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Catack-H's Intermediate Products: Cabonia®

rCF

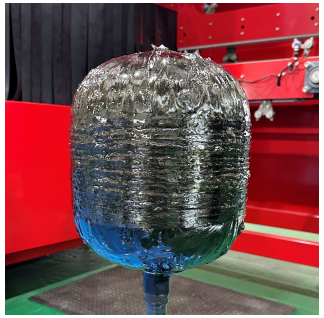
Milled
20 - 200 μm

Chopped
Length : 6, 12 ,50, 60, 70mm

Compounds
PP+rCF, PA6+rCF

Paper (wet-laid)
20-80g/㎡

Felt (needle punched)
100-500g/㎡



Pressure Vessels from recycled continuous fiber

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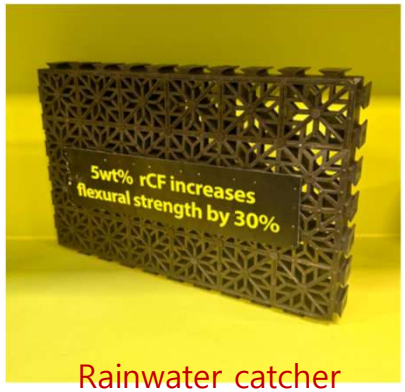
Catack-H's Finished Products

rCF

Engine Mount Bracket

Shoes plate & toe cap



Rainwater catcher

Under Cover

PBV Floor Board

3D print filament

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Next Steps

KOREA

01 Strong Foothold in **Asia-Pacific Area**

02 **Full Operation** of current **1,000MT** facility

03 Expansion to **Europe and USA**

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Conclusion: Closing the Loop is a 2-step process

Eco-friendly EoL Management | Sustainable Carbon Materials | via Solvolysis CFRP/CFRTP Recycling

Catack-H can assist you in managing your CF waste problem

We need your support in introducing rCF into the industry

Only then full circularity can be achieved – we cannot do it alone!

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The Future in
Carbon Fiber Recycling