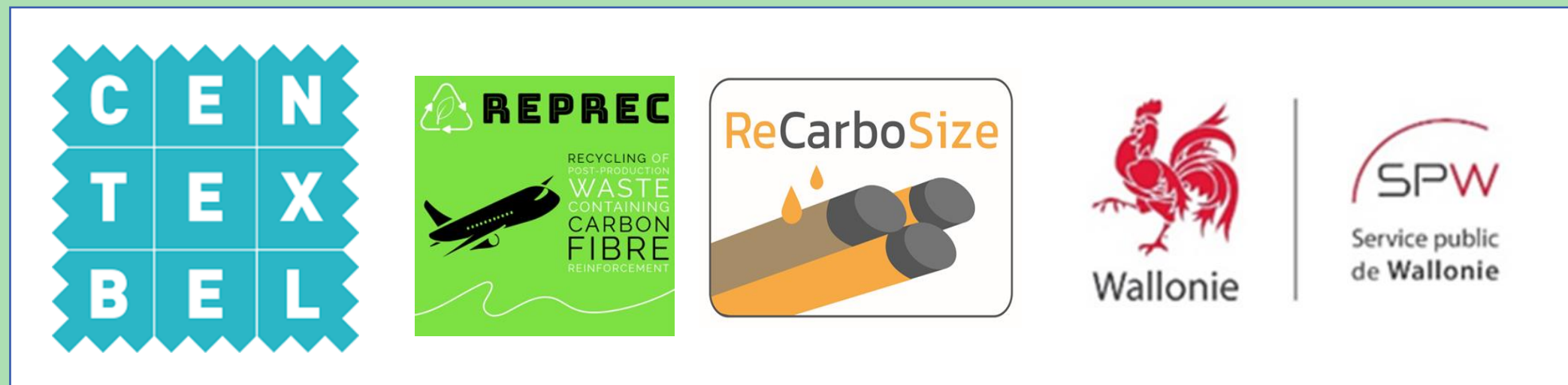


MORPHO FINAL CONFERENCE



Potential of recycling and reusing recycled carbon fibre and post-production carbon fibre prepreg

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INTRODUCTION

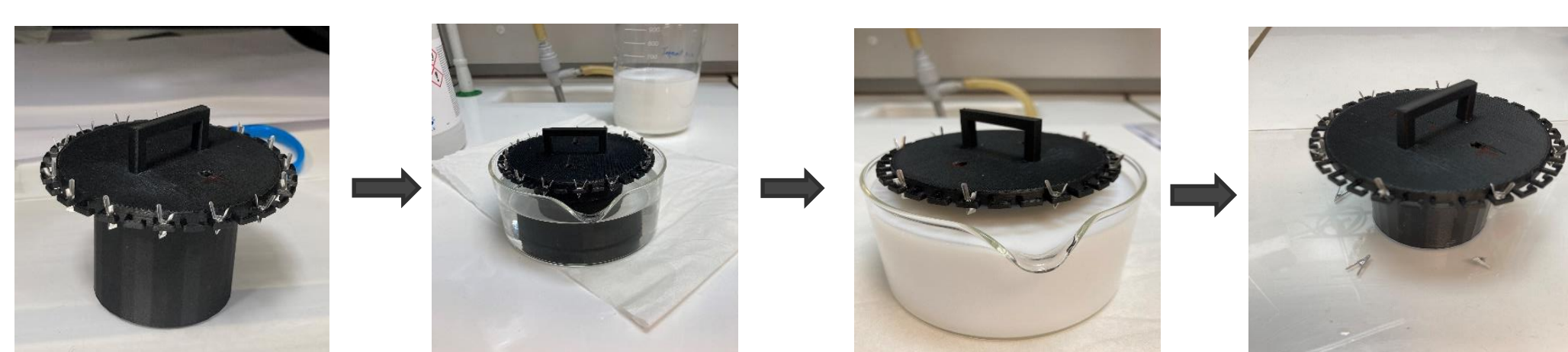
The manufacturing and utilization of carbon fibre-reinforced composite (CFRP) materials have recently grown across various industries, particularly in aeronautic applications, due to their excellent strength-to-weight ratio. Thus, recycling and reusing the CFRP materials and carbon fibres (CF) have become increasingly important due to their high value and potential for sustainability. There are two main sources of these valuable materials that can be recycled and reused: 1) uncured carbon fibre waste, 2) end-of-life of carbon fibre composite. In this context, Centexbel focuses its efforts on both aspects to efficiently recycle and repurpose these materials.

For the **uncured CF composite**, the RePrec deals with the post-production waste, including prepreg scraps, off-cuts, and surplus raw materials. Since it has not been cured, it is easier to recycle and reuse directly or by reforming into new composite. The objective is to define and evaluate the best conditions to directly reuse them into aeronautic application.

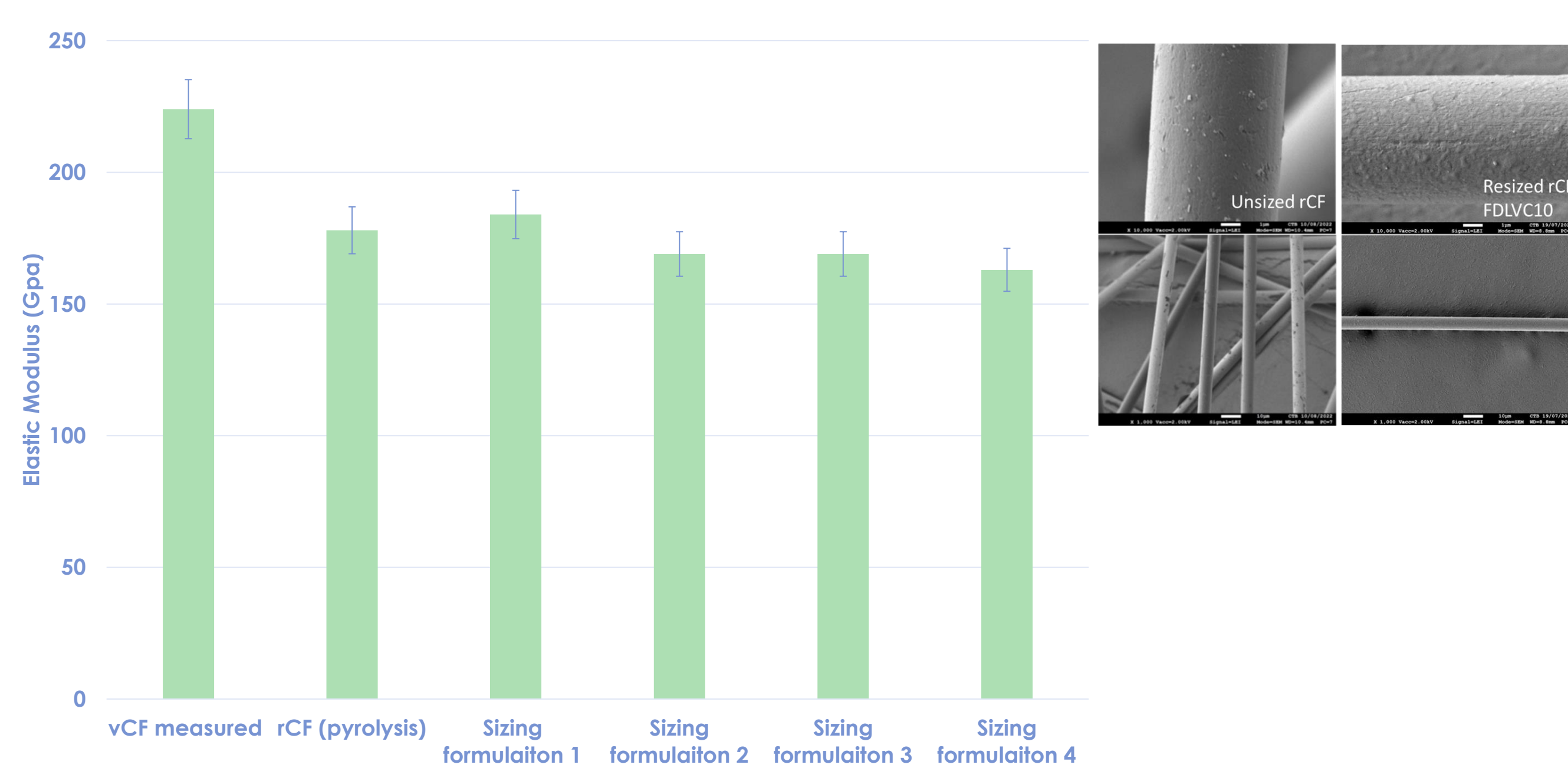
For the **cured CF composite**, the RecarboSize concerns recycled carbon fibre (rCF) recovered from end of life composite. To improve the reuse of the rCFs and enhance their processing behaviour for composite manufacturing. The project aims to develop solutions by creating tailored sizing formulations adapted to recycled carbon fibers for reuse in new composite applications.

Sizing for recycled carbon fibres to optimize adhesion with epoxy matrix

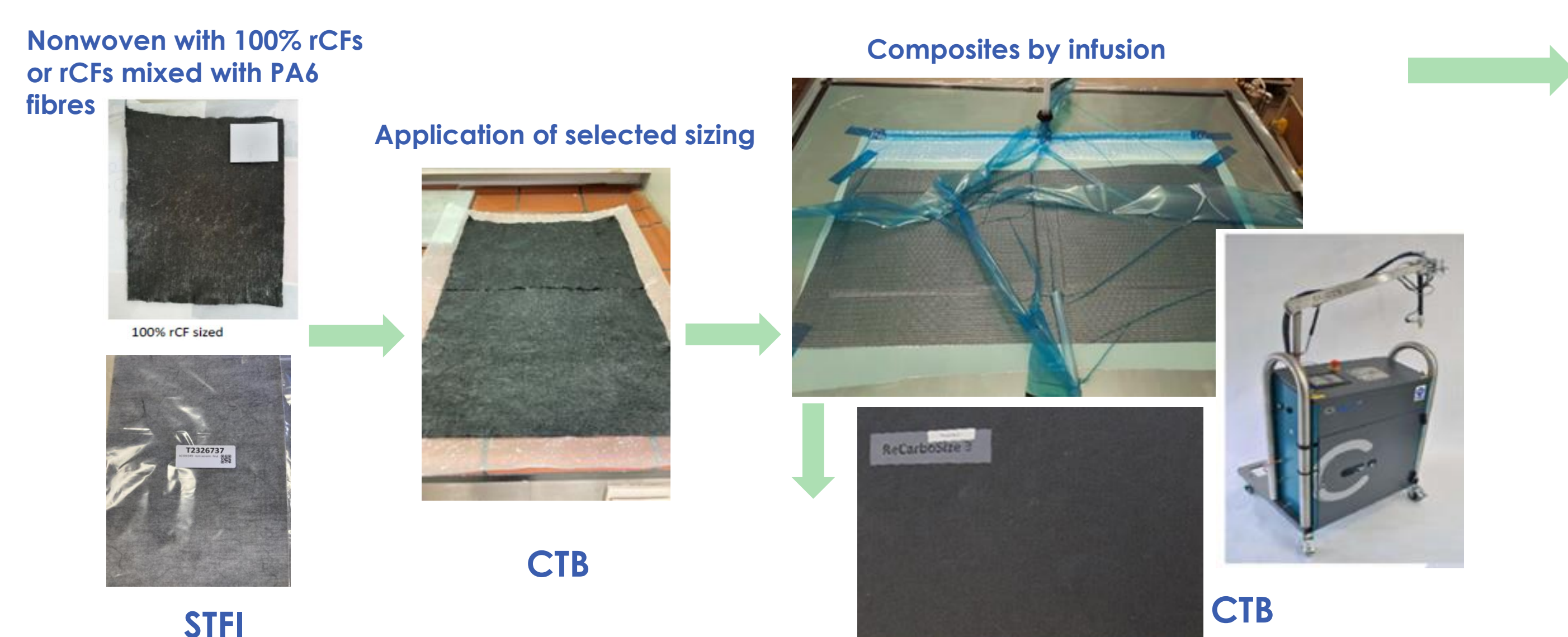
- Development of sizing formulation for rCF and application on single carbon fibre



- Single fibre characterization

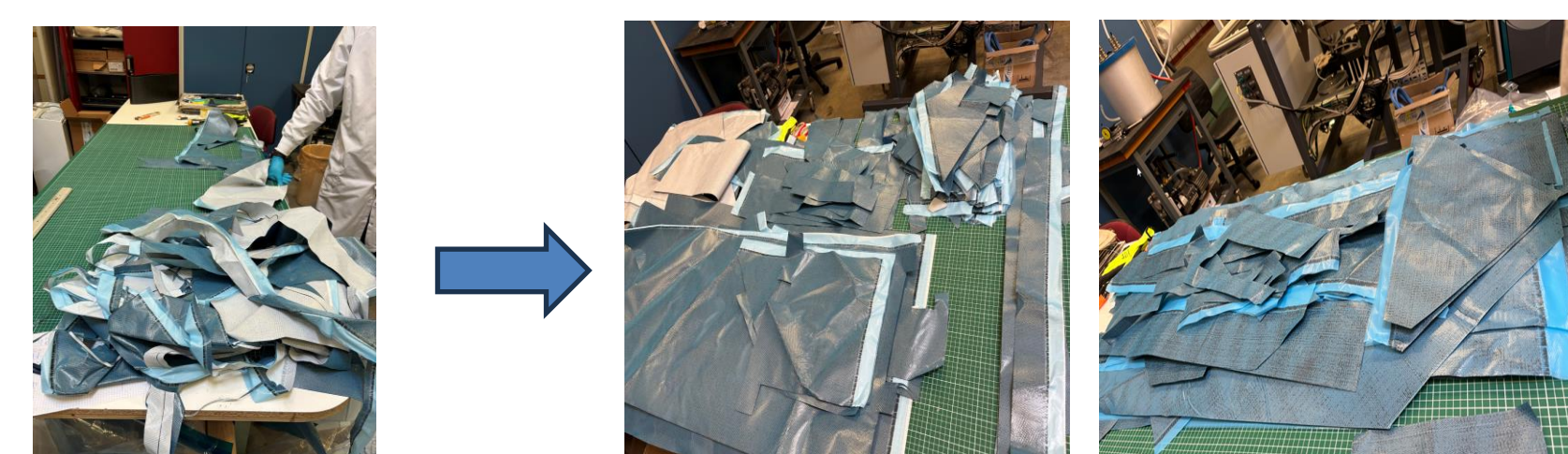


- Sizing process for nonwoven with rCF and rCF composite fabrication



Uncured carbon fibre prepreg waste

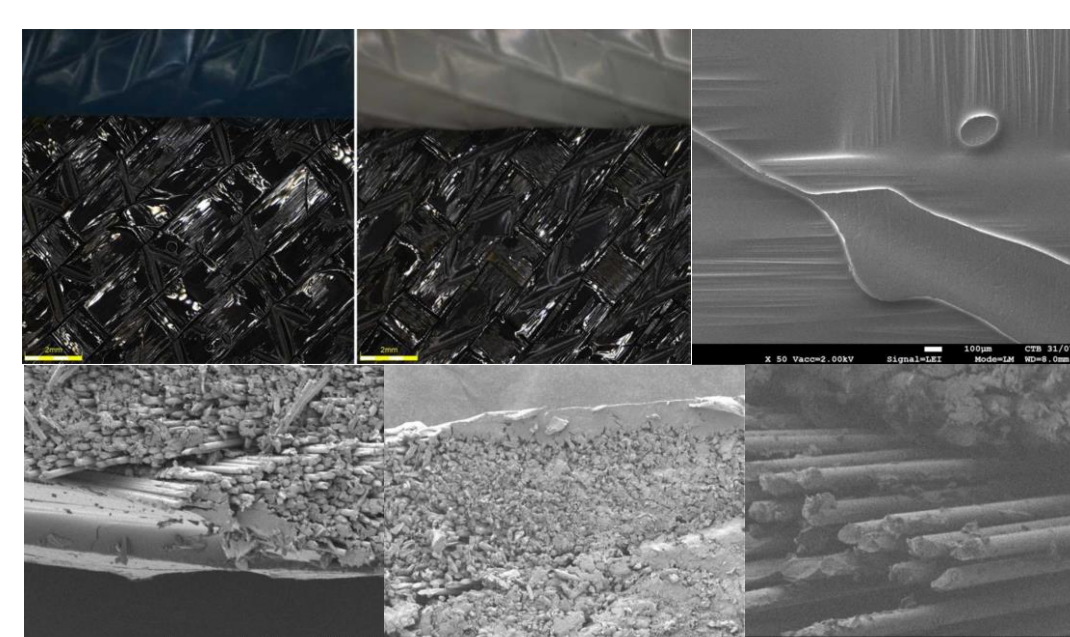
- Collection of post-production waste from aeronautical and composite industries, inventory and classification of the collected wastes



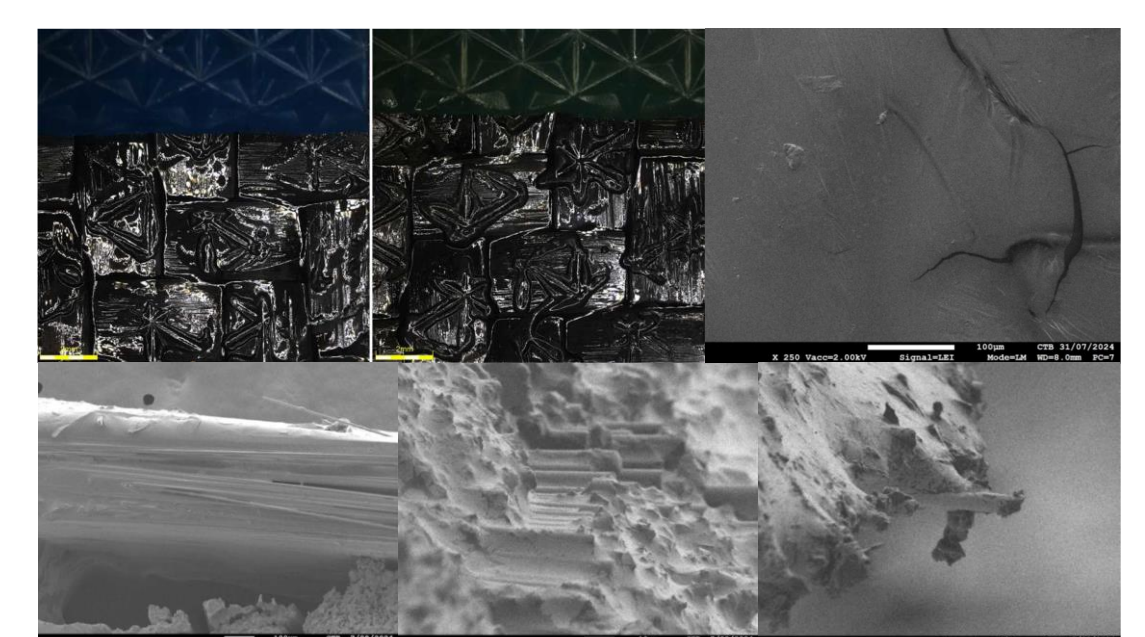
- Physico-chemical analysis to determine the aging conversion rate.

Morphological characterization

CF prepreg ST1

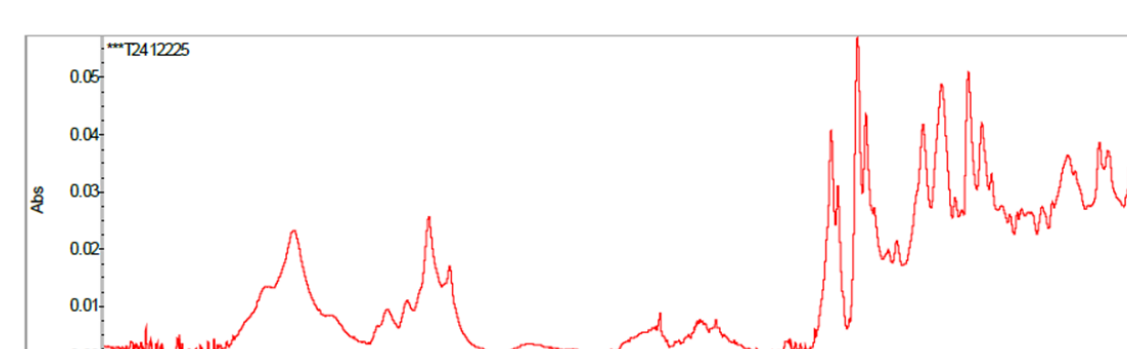


CF prepreg JT1



Chemical characterization

FTIR

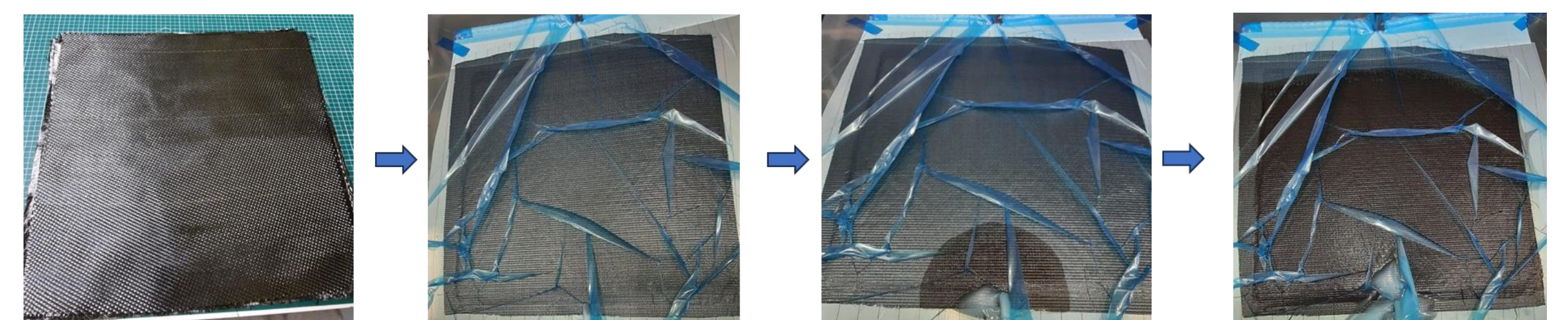


EDX measurement

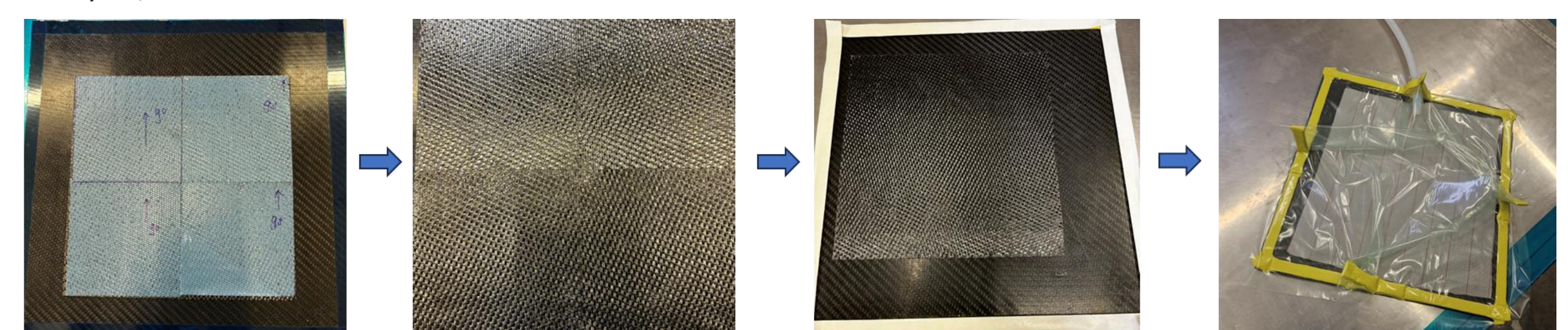
Wt%	C	N	O	Na	Mg	Al	Si	S
Cross section	90.21	5.86	3.93	0	0	0	0	0
Surface	80.31	5.17	10.56	0.09	0	0	0.34	3.54

- Evaluation of reuse in patchwork assemblies using different consolidation technologies

Sample fabrication



8 layers, vacuum infusion



4 layers, side by side, vacuum thermofixation



Acknowledgement

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