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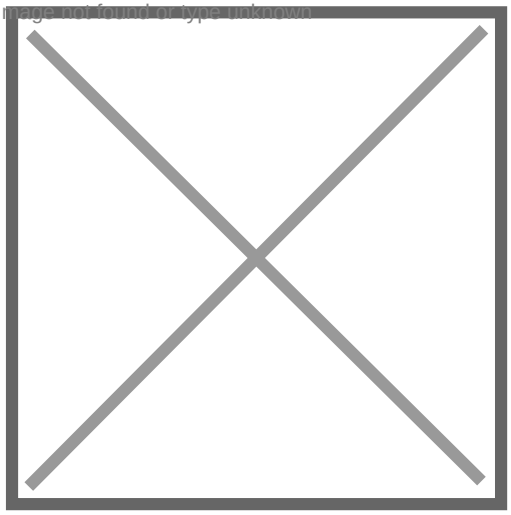

HORIZON-CL4-2021-RESILIENCE-01-01

RECREATE

Full Title: REcycling technologies for Circular REuse and remanufacturing of fiber-reinforced composite mATErials

Aim:

The main objective of the RECREATE project is to develop a set of innovative technologies aimed at exploiting the potential of end-of-life complex composite waste (mainly carbon fiber reinforced composites, and glass fiber reinforced composites) as a feedstock for profitable reuse of parts and materials in the manufacturing industry. The EU composites market size is foreseen to grow steadily with an annual growth rate of 7.5% in the next few years. Legislation is progressively banning landfilling in many countries and the amount of composite waste to be recycled and reused is growing, expected to exceed 80,000 tons in 2025, what represents a huge potential for the manufacturing industry across the EU. On the other side, there is an increasing market demand of high-performance fiber materials (especially carbon) at affordable costs in many sectors like automotive and transportation and in general for the lightweight design field. It is therefore crucial that new technologies evolve and penetrate key industry value chains.

Concept:
The ambition of RECREATE project is: – To develop and validate in relevant environment (TRL6) novel reuse strategies for current generation, large EoL composite parts (including complex multimaterial composites) based on smart recognition and inspection for sorting (Laser Induced Breakdown Spectroscopy – LIBS), high precision dismantling (laser-shock) and repair, T-assisted reshaping, design for disassembly based on reversible joints, AI-assisted decision support systems; – To develop and validate in relevant environment (TRL6) innovative physico-chemical upcycling technologies (catalyst-assisted green

solvolysis, electrofragmentation) allowing simultaneous recovery of high quality, integer, clean fibers and of an organic resin fraction reusable as coating material, at the very end of the multiple reuse processes of parts; – To demonstrate at TRL6 the use of smart and green reversible thermoset resins as enabling materials for the realization of the next generation of fiber-reinforced composites (FRCs) with easier repairability and enhanced reusability, facilitating the transition towards recyclable-by-design composite materials and structures. Moreover, RECREATE addresses another key objective, that is the development of a set of new digital tools for the quantitative evaluation of the environmental and economic performance of the proposed technologies (LCA/LCC) as well as their circularity assessment; and the co-design of innovative digital learning resources, including the realization of MOOCS, serious games and digital twins of some specialty technologies developed in the project, with easy adoption and high replicability.

Start date:
01/06/2022

End date:
31/05/2026