

Green chemistry approaches to recover carbon fibers and improve the recyclability of CFRP composites.



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Carbon Fiber Reinforced Plastic Recycling

This project focuses on a green chemistry approach to recycle CFRP composites by developing an optimized mild solvolysis process. It specifically targets the recovery and reuse of carbon fibers and CFRC powder from waste generated on the pultrusion production line at K-Composite company. This approach aligns with EU recycling regulations, aiming for a significant reduction in composite waste and contributing to sustainable industrial practices.

The study employs a mild chemical solvolysis method with benign solvent and co-reactant in controlled conditions to efficiently digest CFRP composites. The process focuses on the complete recovery of carbon fibers solubilized degraded matrix, aiming to reutilize these materials into new composites. SEM analysis and characterization of recovered fibers approved their intact properties for high-value applications. Simultaneously, the project explores preventive approaches against waste production and utilizing alternative recyclable epoxy resins, aligning with sustainability and circularity goals crucial for maintaining competitive industrial performance.

The objectives are : 1) Optimize a solvolysis process for carbon fiber recovery from CFRPs using benign solvents at temperatures below 200°C (TRL 5-6). 2) Reuse recovered fibers for manufacturing new thermoplastic composites (TRL 4). 3) Develop strategies to reduce waste generation and explore alternative chemistries in pultrusion (TRL 4-5).

