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PRESERVATION OF MECHANICAL PROPERTIES OF CARBON FIBERS AFTER MULTIPLE PYROLYLYSIS CYCLES

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RESEARCH QUESTIONS

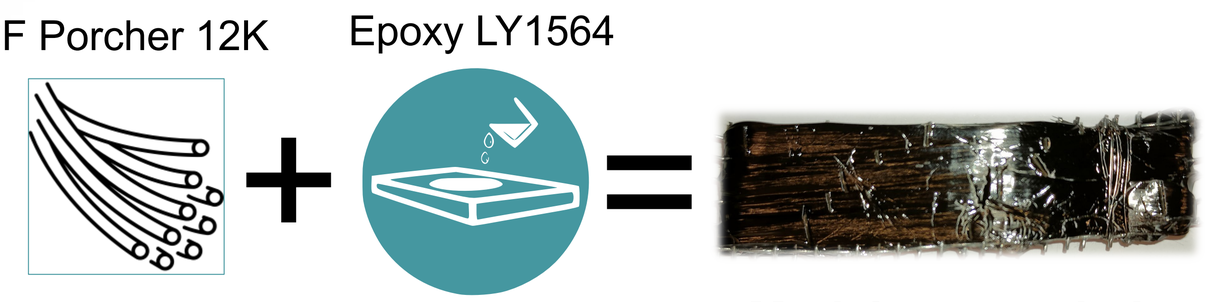
WE CAN RECYCLE CF → **How many times?** / **At what cost in performance?**

WE CAN IMPROVE RECYCLING → **More effective? Faster?**

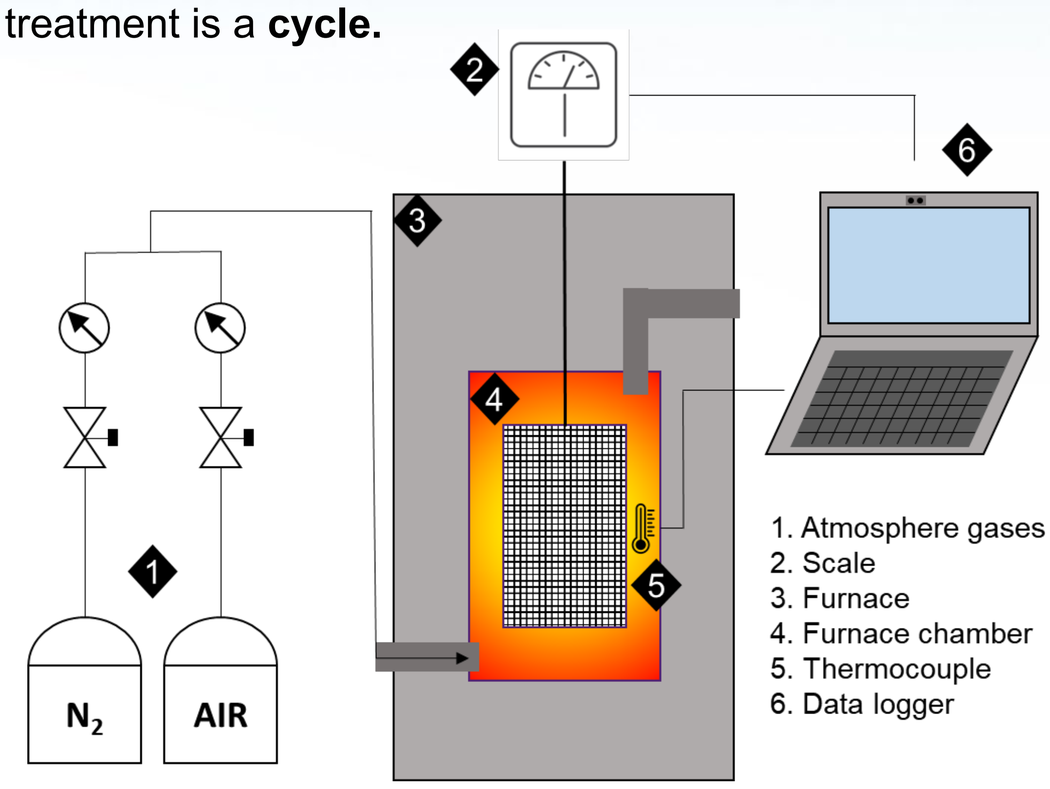
METHODOLOGY

Pyrolysis and consecutive **oxidation** is performed in a furnace with controlled atmosphere and gas flow. Two **distinctive methods** are used. Each method is applied up to three times, **every consecutive** treatment is a **cycle.**

CF Porcher 12K + Epoxy LY1564 = **Model composite!**

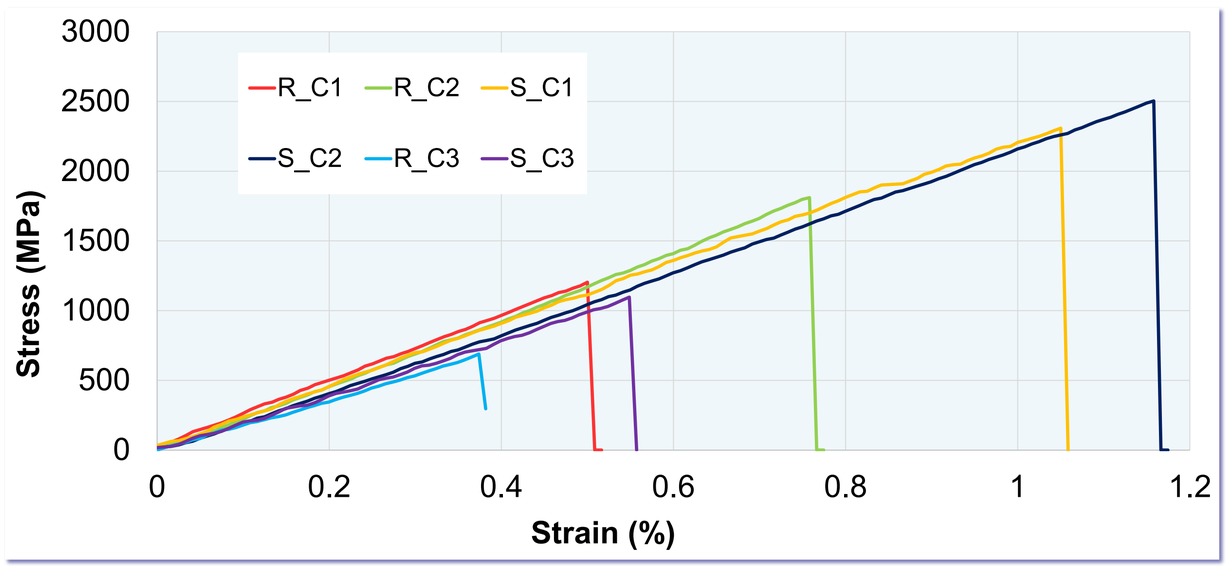


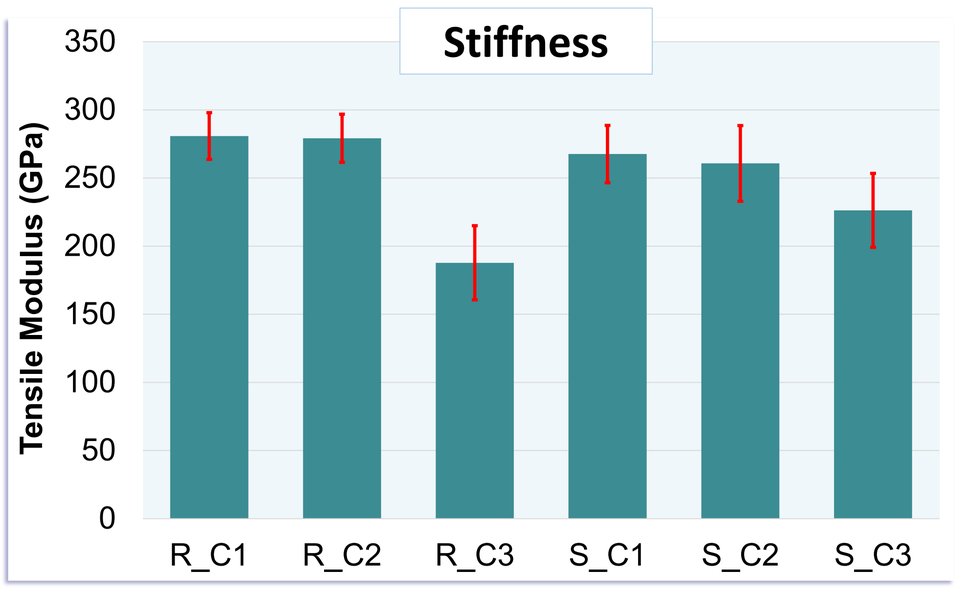
Method	T (°C)	Pyrolysis t (min)	Oxidation t (min)	Total t (min)
Rapid (R)	550	5	10	15
Slow (S)	500	30	30	60

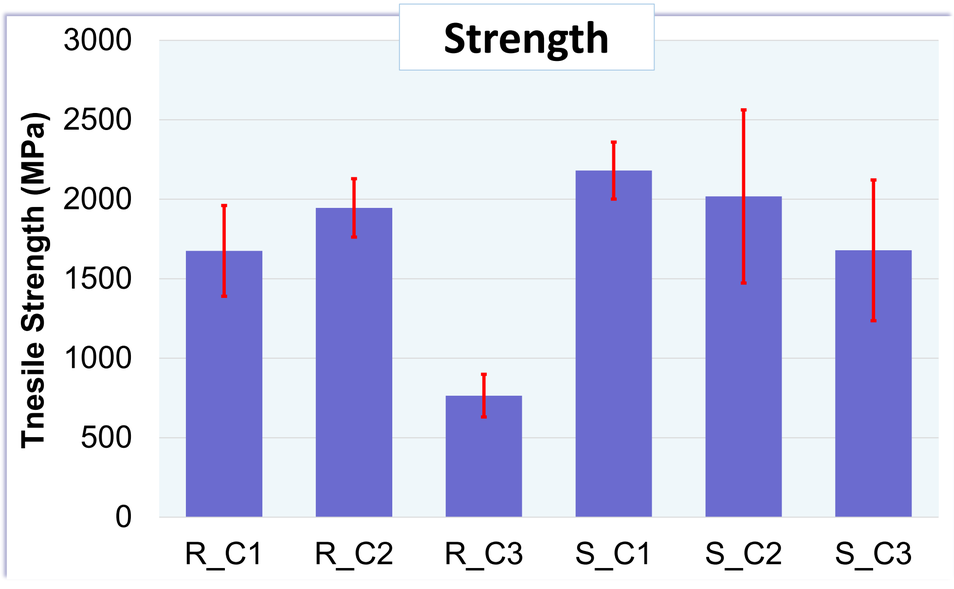


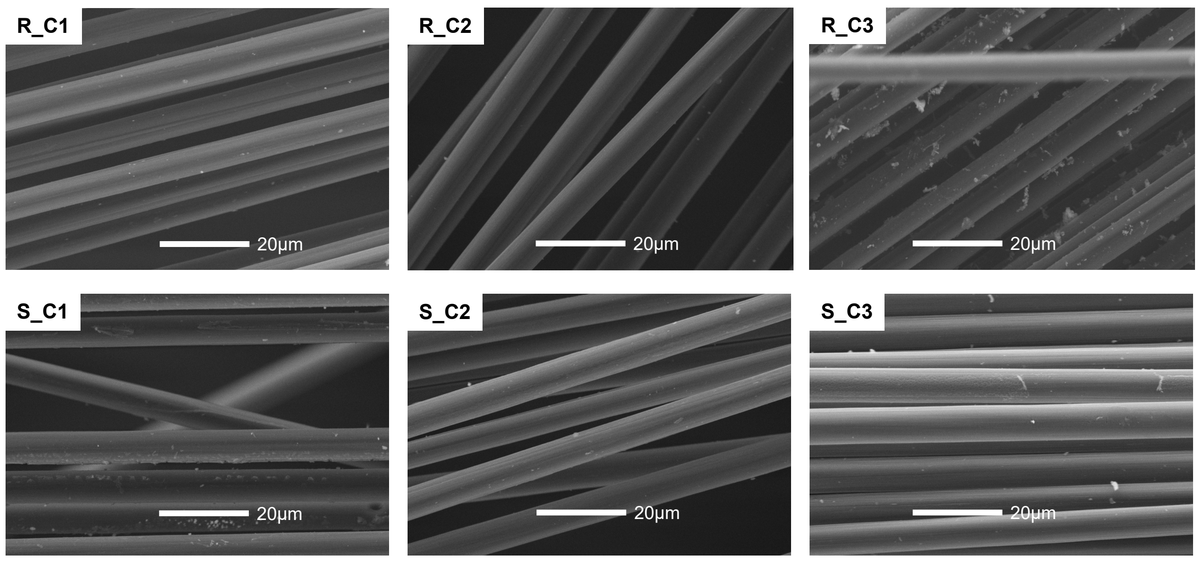
RESULTS

Single fiber tensile tests are performed to evaluate effect of the **recycling** cycles on **properties of CF**.









CONCLUSIONS

- **Rapid** method favours **stiffness** retention, while **slow** method holds **strength** better.
- Above **95%** retention on stiffness after **two cycles**.
- **Third cycle** shows drastic drop of mechanical properties, specially for the rapid method.

This project is within the CREATERNITY Graduate School at LTU

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