Master Student Thesis

Fundamental research and optimisation of novel plastics-to-plastic chemical recycling technology for upcoming start up

Green Chemistry / Polymer Chemistry / Inorganic Chemistry /
Plastic Recycling / Start-up Experience

Join us in our exciting journey to revolutionise the plastics recycling world. We are developing the next generation of chemical plastics recycling technologies based on liquid phase low-temperature autooxidation.

We (Alexandre Kremer and Dr. Andreas Wagner) are an impact driven founder-team based in the ChemSPACE TUM Venture Labs in the Chemistry Department. We have over 10 years of professional experience in sustainability and strong academic track record, particularly in the plastics and chemical industry. We are looking for an outstanding student to support us in scaling up our technology while exploring and optimising the underlying chemistry.

Project context: Finding new feedstocks for the chemical industry constitutes a cornerstone of the net-zero transition by drastically reducing the sector’s dependence on fossil fuels. In parallel, ever-growing volumes of incinerated unrecyclable (plastic) waste are not compatible with Paris pledges and alternative waste treatment is crucially needed. We aim to develop the first end-to-end integrated technology platform for plastic-to-plastic chemical recycling.

Objective of the project: The project will span over several areas based on time availability and student interest including: (1) study our breakthrough chemical recycling process and resulting chemical products formed from polymer resins and ‘hard-to-recycle’ real-life plastic waste samples (2) perform kinetic studies and optimize the technological pathway (e.g., pressure, temperature, catalyst concentration, solvent, time) to maximize carbon recovery (3) test different catalyst recovery and recycling technologies relevant at industrial scale. Key goals:

- Mapping of chemical products formed and respective ratios for different plastic waste streams.
- Determination of optimal reaction conditions for a selected waste stream.
- Validate the use of a catalyst recovery method.

Requirements for students: Prior experience in organic, inorganic or polymer chemistry with emphasis on catalysis. Strong interest in entrepreneurship and sustainability are a big plus. We are both driven by making a positive impact in our professional career and would love to work with like-minded students.

Main contact points for this project – reach out for a coffee so we can get to know each other!

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We are in contact with several professors ready to coordinate the thesis from an academic perspective. Thesis supervisor will be selected in coordination with the student based on the final topic identified.