



Master Thesis in Mechatronics, Physics and Chemistry

Chain Extension Under Scrutiny: Experimental and Model-Based Analysis of Kinetics for rPET Upgrading

CHASE is seeking a skilled and motivated young scientist willing to work on future proof topics dealing with sustainability and circular economy. You will be part of a multi-disciplinary team and acquire first-hand information on your selected topic and beyond.

We are offering positions for students with a finished BSc degree, in the field of Chemistry, Physics, Polymer- or Process Engineering, for pursuing their diploma/master thesis, on a part-time basis (10 to 20h/week), limited to 12 months, to strengthen our team at the headquarters in Linz with immediate entry.

CHASE is a European Research and Technology Organization for Chemical Systems Engineering with its headquarters in Austria. We enable companies in the chemical process industry to make their production more energy-efficient, more resource-saving and more sustainable.

This master thesis investigates the reaction kinetics of liquid-state polycondensation (LSP) as a process for upgrading mechanically recycled PET, combining experimental, modelling, and analytical components. Mechanical recycling degrades molecular weight and intrinsic viscosity (IV), limiting rPET suitability for demanding applications. LSP restores chain length under vacuum at elevated temperatures by driving polycondensation and removing volatile by-products. Beyond kinetic modelling, the thesis explores impedance spectroscopy as an in-situ analytical approach to monitor IV evolution in the PET melt, establishing the correlation between dielectric relaxation parameters and molecular weight progression during polycondensation.

We are looking forward to hearing from you: personal@chasecenter.at

Reference number: 035

Application: until 30 November 2026

CHASE your future

You will contribute to the following tasks:

- Design and build a high-temperature measurement cell for dielectric spectroscopy of polymers from solid state to melt under vacuum conditions.
- Define and optimize suitable electrode geometry and measurement conditions.
- Perform temperature-dependent dielectric spectroscopy measurements on polymer samples across the solid-melt transition.
- Analyze the impedance spectra, model and extract relevant dielectric parameters, comparing results with literature data.
- Prepare a certified reference sample series with systematically varied IV values, characterized by viscometry, and end-group titration, serving as the calibration backbone for all dielectric correlations.
- Develop and validate an empirical IV-dielectric correlation model, quantifying predictive uncertainty and testing transferability to independent rPET samples of varied thermal history within another collaborative master thesis.

Your expertise:

- Strong foundation in mechatronics, modelling, knowledge in chemistry and polymer chemistry is a benefit.
- Practical experience in electrochemical measurement techniques and potentiometric titration.
- Capacity for rigorous experimental design, including calibration strategy, uncertainty quantification, and systematic variation of process parameters – not merely executing protocols but critically evaluating them.
- Independent, detail-oriented working style with tolerance for ambiguity in method development.
- Ability to work across disciplinary boundaries.
- Competence in data modelling and regression analysis.
- Effective communication skills in English and/or German.

CHASE your career

We are committed to providing a framework for your professional growth:

- Work alongside academic professionals to enhance your expertise in mechatronics, kinetic modelling as well as polymer chemistry.
- Earn a competitive salary while making impactful contributions to innovative research. The expected monthly salary is EUR 2.658,00 (on a basis of 40h/week).
- Play a key role in advancing recycling technologies by contributing to deeper process understanding via development and combination of new approaches.

For further information, please contact:

Gunnar Spiegel, Area Manager – Circular Process Streams
gunnar.spiegel@chasecenter.at

We look forward to receiving your application (cover letter, CV, academic certificates, employment references), including the reference number of the job posting, to the following email address: personal@chasecenter.at

By submitting your application documents, you expressly consent to the transmission of your application documents to the partners involved in CHASE.

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