



Master Thesis in Chemistry

Design of experiment in optimization of constituents in high-entropic oxides for CO₂ hydrogenation to methanol

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, Mechatronics, 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 thesis focuses on the synthesis and optimization of high-entropy oxides (HEOs) as heterogeneous catalysts for CO₂ hydrogenation to methanol. First, a novel shaping and synthesis method for HEO catalysts will be investigated, followed by a structured design of experiments (DoE) approach. An initial coarse DoE will be conducted to screen and evaluate the influence of each constituent, simplifying the vast compositional space. Based on these findings, a refined DoE will then target the most impactful constituents for further optimization. Once an optimal composition is determined, activation protocols will be studied to enhance catalytic performance in CO₂ hydrogenation.

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

Reference number: 038

Application: until 30 November 2026

CHASE your future

You will contribute to the following tasks:

- Develop a shaping and novel synthesis process for high entropic oxide catalysts.
- Perform a design of experiment for the composition of a selected high entropic oxide.
- Evaluate the catalytic performance of high entropic oxides in the hydrogenation of CO₂.
- Study catalyst activation protocols to further optimize the catalysts.

Your expertise:

- Proficiency in statistics and setting up and analyzing DoE.
- Background in characterization of materials including surfaces and crystal structures.
- Hands-on skills in operating pressurized catalytic reactors.
- Good analytical and problem-solving skills.
- Independent and structured workflow.
- Effective communication skills in both English and German.

CHASE your career

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

- Engage in cutting-edge research to develop heterogeneous catalysts for the hydrogenation of CO₂ and contributing to carbon circularity.
- Work alongside academic professionals and industry partners building your expertise in heterogeneous catalysis, materials science and sustainability.
- Earn a competitive salary while researching CO₂ abatement strategies.
The expected monthly salary is EUR 2.658,00 (on a basis of 40h/week).

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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