Ass. Prof. Sustainable Future Mobility
Dept. of Aerospace and Geodesy
School of Engineering and Design
Technische Universität München

As of now, we are looking to extend our team with a full time

Postdoc Position: Kinetic Mechanism Development of Low-GWP Fluorinated Refrigerants (m/f/d)

Ass. Prof. Sustainable Future Mobility, Aerospace & Geodesy, School of Engineering and Design at TUM

Information

The Assistant Professorship of Sustainable Future Mobility is part of the Department of Aerospace and Geodesy within the TUM School of Engineering and Design. The group carries out experimental and computational research in the areas of novel aviation and maritime propulsion (combustor design, thermoacoustics, SAF, H_2, ammonia) as well as hydrogen mixtures and refrigerant safety technology. Our focus in research and teaching is based on the principles of technical thermodynamics and chemical reaction kinetics.

The expected demand for refrigerating and air-conditioning systems in the future will lead to increasing volumes of refrigerants globally. Due to the high global warming potential (GWP) of most of these substances and in response to the rapid growth of hydrochlorofluorocarbons (HCFC) and hydrofluorocarbons (HFC) emissions, the Kyoto Protocol to the United Nations Framework Convention on Climate Change sets binding emission reduction targets for greenhouse gases and, therefore, also for fluorinated refrigerants. To achieve an improved HFC breakdown in the troposphere, i.e., which allows HFCs to have a low GWP, mainly molecules with double bonds or added hydrogen atoms are selected. In turn, the higher reactivity can also reduce the thermal stability of the HFC enhancing the decomposition reactivity and flammability. Consequently, only a good and detailed understanding of the underlying ignition, pyrolysis, and combustion behavior ensures a safe use of HFC with low GWP.

In order to assess these behaviours under a wider range of conditions, predictive tools are required to save time, effort, and experimental expenses and to provide data unachievable by experiments. Chemical kinetic models are the basis for a predictive tool and are used to understand, optimize, and engineer the impact of each HFC candidate. Despite the expected widespread use of HFC with low GWP as flame suppressants and refrigerants as working fluids only limited information is available on detailed chemical kinetic mechanisms and on the key elementary reactions involved. Addressing this shortcoming is the goal of this project. Please visit the DFG research unit description for more information on the topic https://gepris.dfg.de/gepris/projekt/497007546?language=en.

Your Tasks

We are seeking a postdoc to lead RMG-assisted development of detailed oxidation mechanisms for 2,3,3,3-tetrafluoropropene (R1234yf) and trans-1,3,3,3-tetrafluoropropene (R1234ze(E)). The position combines mechanism building and validation with algorithm and database contributions to RMG, supported by electronic-structure data from the literature, and where needed, new calculations, extensions to rate rules and training reactions for halogenated species, improved pressure-dependence workflows, family trees, and data quality checks. Further activities include the supervision of students and teaching.

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Your qualifications

- PhD in Chemical Engineering, Chemistry, Physical Chemistry, or Mechanical Engineering with a focus on combustion/atmospheric sciences
    - Proven experience in chemical kinetics and mechanism development, e.g., using RMG-Py/Arkane and Cantera/Chemkin
    - Solid background in thermochemistry and pressure-dependent kinetics (fall-off, RRKM/ME, PLOG/Chebyshev)
- Programming: Python, version control (Git), comfortable with reproducible workflows/CI

What we offer

We offer a full-time position as academic staff and a central role in a DFG Research Unit at the interface of kinetics, safety, and modeling. Access to top computing infrastructure, e.g., LRZ, modern reproducibility toolchains, and the opportunity to contribute to open-source RMG. Further, we offer support for conference travel and high-impact publications. The position will be initially limited to one year. Payment will be based on the Collective Agreement for the Civil Service of the Länder (*TV-L*). TUM strives to raise the proportion of women in its workforce and explicitly encourages applications from qualified women. Applications from disabled persons with essentially the same qualifications will be given preference. International candidates are highly encouraged to apply.

Note on data protection:

When applying for a position at the Technical University of Munich (TUM), you submit personal data. Please refer to our data protection information in accordance with Article 13 of the General Data Protection Regulation (DSGVO) regarding the collection and processing of personal data in the context of your application. By submitting your application, you confirm that you have taken note of the TUM data protection information.
https://portal.mytum.de/kompass/datenschutz/Bewerbung/document_view?

Application

If you are interested in working with our team, please send your application in one single pdf file (incl. an introductory letter, strong CV with a list of publications and software contributions (links to GitHub welcome), qualifications, two work samples, e.g., papers or code excerpts, and names/contact details of two referees) to the Assistant Professorship, Prof. Dr.-Ing. Agnes Jocher, Dept. Aerospace & Geodesy, School of Engineering & Design, Boltzmannstr. 15, 85748 Garching, no later than **January 7th, 2026.**
Email to office: office.tfd@ed.tum.de. We look forward to receiving your informative documents.

Do not hesitate to contact Ms. Brigitte Blume for any administrative questions you may have (+49.89.289 16217, office.tfd@ed.tum.de).

If you apply by using physical paper, we request that you submit only copies of official documents, as we cannot return your materials after the completion of the application process.

Application deadline / Closing date: **January 7th, 2026**