

MARVIN KUSENBERG

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PROFESSIONAL EXPERIENCE

Since 09/2026

ASSISTANT PROFESSOR (50%)

Laboratory for Chemical Technology, Ghent University
Ghent, Belgium

Since 09/2026

POST-DOCTORAL RESEARCHER (50%)

Laboratory for Chemical Technology, Ghent University
Ghent, Belgium

10/2023 – 09/2026

POST-DOCTORAL RESEARCHER (FWO)

Laboratory for Chemical Technology, Ghent University
Ghent, Belgium

02/2019 – 08/2023

DOCTORAL RESEARCHER

Laboratory for Chemical Technology, Ghent University
Ghent, Belgium

EDUCATION

01/2019 – 08/2023

PHD CHEMICAL ENGINEERING

Laboratory for Chemical Technology, Ghent University, Ghent, Belgium

- Thesis: "Chemical Recycling of Mixed Plastic Packaging Waste via Pyrolysis and Steam Cracking: The Role of Contaminants"

10/2015 – 10/2018

MSc CHEMICAL AND BIOLOGICAL ENGINEERING

University of Erlangen-Nuremberg, Erlangen, Germany

- Final grade: 1.1 (top 14% of class)
- Thesis "Commissioning of a lab-scale plant for continuous hydrogenation of Liquid Organic Hydrogen Carriers (LOHC)"

10/2010 – 09/2015

BSc BIOCHEMICAL ENGINEERING

Technical University of Dortmund, Dortmund, Germany

- Thesis: "Modeling of the influence of ionic liquids on phase equilibria and reaction equilibria"

A1 PUBLICATIONS IN INTERNATIONAL RESEARCH JOURNALS

1. Jamil Abdulrahman, A., Heikkinen, N., Nevander, M., Auersvald, M., Kulkarni, S.P., Mynko, O., Parvizi, B., Withoeck, D., Huotari, M., Lehtonen, J., Frilund, C., Reinikainen, M., Mäkelä, E., **Kusenbergh, M.**, Van Geem, K.M. (2026). CO₂ to chemicals: evaluating the potential of Fischer-Tropsch naphthas as a circular source of light olefins. *Journal of CO₂ Utilization*, **111**, 103555.
2. Kulkarni, S.P., Popelier, G., Auersvald, M., **Kusenbergh, M.**, Brighty, G., Daley, R., Van Geem, K.M. (2026). Integrated molecular-level oil characterization and physics-informed surrogate modeling for enhancing the tractability of supercritical water liquefaction of polyethylene. *Chemical Engineering Journal Advances*, , 101281.
3. Jamil Abdulrahman, A., **Kusenbergh, M.**, Auersvald, M., Pernalet Pina, C., Parvizi, B., Havaei, M., Thybaut, J.W., Van Geem, K.M. (2025). Advancing circular plastics: hydrotreatment of pyrolysis oils for high-yield ethylene production. *Waste Management*, **211**, 115287.
4. Dossche, G., Ureel, Y., Aguilera, M.L., **Kusenbergh, M.**, Rodgers, R.P., Sabbe, M.K., Van Geem, K.M. (2025). Characterization and Source Tracing of Nitrogenates and Halogens in Polyolefin Waste Pyrolysis Oils by Ultrahigh-Resolution FT-ICR MS. *Energy & Fuels*, **39**(48), 22780-22796.
5. Ureel, Y., Piña, C.P., Dunkle, M.N., Pijcke, P., da Costa Magalhaes, B., **Kusenbergh, M.**, Bellos, G., Sabbe, M.K., Thybaut, J.W., Van Geem, K.M. (2025). Detailed analysis of olefins and diolefins in hydrotreated plastic waste pyrolysis oils by GC-VUV. *Waste Management*, **202**, 114828.
6. De Ras, K., Herbinet, O., Battin-Leclerc, F., Eschenbacher, A., **Kusenbergh, M.**, Varghese, R.J., Panaget, T., Akin, O., Fenard, Y., Tran, L.S., Vanhove, G., Thybaut, J.W., Van Geem, K.M. (2025). A Fundamental investigation of the pyrolysis chemistry of oxymethylene ethers. Part II: Experiments and comprehensive model analysis. *Combustion and Flame*, **275**, 114122.
7. Jean, A., Magalhaes, B.C., Pijcke, P., Verhoosel, N., Sanliturk, T., Ureel, Y., **Kusenbergh, M.**, Ruitenbeek, M., Bellos, G., Van Geem, K.M., Dunkle, M.N. (2025). Organochloride Speciation in Plastic Pyrolysis Oil by GC × GC Coupled to High-Resolution TOF-MS Using Scripting Expressions. *Analytical Chemistry*, **97**(20), 10680–10690.
8. Ureel, Y., Chacón-Patiño, M.L., **Kusenbergh, M.**, Ginzburg, A., Rodgers, R.P., Sabbe, M., K., Van Geem, K.M. (2024). Compositional Analysis of Oxygenates and Hydrocarbons in Waste and Virgin Polyolefin Pyrolysis Oils by Ultrahigh-Resolution Fourier Transform Ion Cyclotron Resonance Mass Spectrometry. *Energy & Fuels*, **39**(2), 1283–1295.
9. **Kusenbergh, M.**, De Langhe, S., Parvizi, B., Abdulrahman, A.J., Varghese, R.J., Aravindakshan, S.U., Kurkijärvi, A., Gandarillas, A.M., Jamieson, J., De Meester, S., Van Geem, K.M. (2024). Characterization and impact of oxygenates in post-consumer plastic waste-derived pyrolysis

- oils on steam cracking process efficiency. *Journal of Analytical and Applied Pyrolysis*, **181**, 106571.
10. Ureel, Y., Chacón-Patiño, M.L., **Kusenbergh, M.**, Rodgers, R.P., Sabbe, M., K., Van Geem, K.M. (2024). Characterization of PP and PE Waste Pyrolysis Oils by Ultrahigh-Resolution Fourier Transform Ion Cyclotron Resonance Mass Spectrometry. *Energy & Fuels*, **38**(12), 11148–11160.
 11. dos S. Vargette, L., Mohamadzadeh S.hirazi, H., Mynko, O., **Kusenbergh, M.**, Jamieson, J., Muñoz Gandarillas, A.E., Ukkandath Aravindakshan, S., Reyniers, M.F., Van Geem, K.M. (2023). Comprehensive Fouling Assessment in Steam Crackers: Fossil versus Renewable NEXBTL Naphtha. *Industrial & Engineering Chemistry Research*, **63**(1), 111–120.
 12. De Ras, K., **Kusenbergh, M.**, Thybaut, J.W., Van Geem, K.M. (2023). Unraveling the carbene chemistry of oxymethylene ethers: Experimental investigation and kinetic modeling of the high-temperature pyrolysis of OME-2. *Proceedings of the Combustion Institute*, **39**(1), 125–133.
 13. **Kusenbergh, M.**, Roosen, M., Doktor, A., Casado, L., Jamil Abdulrahman, A., Parvizi, B., Eschenbacher, A., Biadi, E., Laudou, N., Jänsch, D., De Meester, S., Van Geem, K.M., (2023). Contaminant removal from plastic waste pyrolysis oil via depth filtration and the impact on chemical recycling: A simple solution with significant impact. *Chemical Engineering Journal*, **473**, 145259.
 14. Zeb, W., Roosen, M., Knockaert, P., Janssens, S., Withoeck, D., **Kusenbergh, M.**, Hogie, J., Billen, P., Tavernier, S., Van Geem, K.M., De Meester, S. (2023). Purification and characterisation of post-consumer plastic pyrolysis oil fractionated by vacuum distillation. *Journal of Cleaner Production*, **416**, 137881 .
 15. Seifali Abbas-Abadi, M., **Kusenbergh, M.**, Zayoud, A., Roosen, M., Vermeire, F., Madanikashani, S., Kuzmanovic, M., Parvizi, B., Kresovic, U., De Meester, S., Van Geem, K.M. (2023). Thermal pyrolysis of waste versus virgin polyolefin feedstocks: The role of pressure, temperature and waste composition. *Waste Management*, **165**, 108-118.
 16. Saputra Lase, I., Tonini, D., Caro, D., Albizzati, P.F., Cristobal, J., Roosen, M., **Kusenbergh, M.**, Ragaert, K., Van Geem, K.M., Dewulf, J., De Meester, S. (2023.). How much can chemical recycling contribute to plastic waste recycling in Europe? An assessment using material flow analysis modeling. *Resources, Conservation and Recycling*, **192**, 106916.
 17. **Kusenbergh, M.**, Eschenbacher, A., Delva, L., De Meester, S., Delikonstantis, E., Stefanidis, G.D., Ragaert, K., Van Geem, K.M. (2022). Towards high-quality petrochemical feedstocks from mixed plastic packaging waste via advanced recycling: The past, present and future. *Fuel Processing Technology*, **238**, 107474.
 18. Abbas-Abadi, M.S., **Kusenbergh, M.**, Mohamadzadeh Shirazi, H., Goshayeshi, B., Van Geem, K.M. (2022). Towards full recyclability of end-of-life tires: Challenges and opportunities. *Journal of Cleaner Production*, **374**, 134036.
 19. Huysveld, S., Ragaert, K., Demets, R., Nhu, T.T., Civancik-Uslu, D., **Kusenbergh, M.**, Van Geem, K.M., De Meester, S., Dewulf, J. (2022). Technical and market substitutability of recycled materials: Calculating the environmental benefits of mechanical and chemical recycling of plastic packaging waste. *Waste Management*, **152**, 69–79.

20. **Kusenberg, M.**, Fausson, G.C., Dao Thi, H., Roosen, M., Grilc, M., Eschenbacher, A., De Meester, S., Van Geem, K.M. (2022). Maximizing olefin production via steam cracking of distilled pyrolysis oils from difficult-to-recycle municipal plastic waste and marine litter. *Science of The Total Environment*, **838**, 156092.
21. Abbas-Abadi, M.S., Zayoud, A., **Kusenberg, M.**, Roosen, M., Vermeire, F., Yazdani, P., Van Waeyenberg, J., Eschenbacher, A., Arraez Hernandez, F.J., Kuzmanović, M., Dao Thi, H., Kresovic, U., Sels, B., Van Puyvelde, P., De Meester, S., Saeys, M., Van Geem, K.M. (2022). Thermochemical recycling of end-of-life and virgin HDPE: A pilot-scale study. *Journal of Analytical and Applied Pyrolysis*, **166**, 105614.
22. De Ras, K., **Kusenberg, M.**, Vanhove, G., Fenard, Y., Eschenbacher, A., Varghese, R.J., Aerssens, J., Van de Vijver, R., Tran, L.-S., Thybaut, J.W., Van Geem, K.M. (2022). A detailed experimental and kinetic modeling study on pyrolysis and oxidation of oxymethylene ether-2 (OME₂). *Combustion and Flame*, **238**, 111914.
23. **Kusenberg, M.**, Roosen, M., Zayoud, A., Djokic, M.R., Dao Thi, H., De Meester, S., Ragaert, K., Kresovic, U., Van Geem, K.M. (n.d.). Assessing the feasibility of chemical recycling via steam cracking of untreated plastic waste pyrolysis oils: Feedstock impurities, product yields and coke formation. *Waste Management*, **141**, 104-114.
24. **Kusenberg, M.**, Zayoud, A., Roosen, M., Dao Thi, H., Abbas-Abadi, M.S., Eschenbacher, A., Kresovic, U., De Meester, S., Van Geem, K.M. (2022). A comprehensive experimental investigation of plastic waste pyrolysis oil quality and its dependence on the plastic waste composition. *Fuel Processing Technology*, **227**, 107090.
25. Zayoud, A., Dao Thi, H., **Kusenberg, M.**, Eschenbacher, A., Kresovic, U., Alderweireldt, N., Djokic, M., Van Geem, K.M. (2022.). Pyrolysis of end-of-life polystyrene in a pilot-scale reactor: Maximizing styrene production. *Waste Management*, **139**, 85-95.
26. **Kusenberg, M.**, Eschenbacher, A., Djokic, M.R., Zayoud, A., Ragaert, K., De Meester, S., Van Geem, K.M. (2022). Opportunities and challenges for the application of post-consumer plastic waste pyrolysis oils as steam cracker feedstocks: To decontaminate or not to decontaminate?. *Waste Management*, **138**, 83-115.
27. Roosen, M., Mys, N., **Kusenberg, M.**, Billen, P., Dumoulin, A., Dewulf, J., Van Geem, K.M., Ragaert, K., De Meester, S. (2020.). Detailed Analysis of the Composition of Selected Plastic Packaging Waste Products and Its Implications for Mechanical and Thermochemical Recycling., *Environmental Science & Technology*, **54**(20), 13282-13293.

PRESENTATIONS AT INTERNATIONAL CONFERENCES

1. **Kusenberg, M.**, De Meester, S., and Van Geem, K.M. Mass Balance in chemical recycling – a clarification. Presented at Sustainability in Packaging conference 2025, Barcelona, Spain.
2. **Kusenberg, M.**, De Meester, S., and Van Geem, K.M. How to measure recycled content: mass balance approach in chemical recycling. Presented at Capture day – Plastics breakout session 2025, Antwerp, Belgium.

3. **Kusenbergh, M.**, and Van Geem, K.M. Plastic waste pyrolysis oils as steam cracker feedstocks: The role of contaminants. Presented at British Plastics Federation Chemical Recycling Workshop 2024, online.
4. **Kusenbergh, M.**, and Van Geem, K.M. Plastic waste pyrolysis oils as steam cracker feedstocks: The role of contaminants. Presented at European Ethylene Producers' Conference Workshop 2024, Antwerp, Belgium.
5. **Kusenbergh, M.**, Towards high-quality petrochemical feedstocks from plastic waste pyrolysis oils: Contaminant removal via depths filtration and its impact on steam cracking. Presented at Schmidt+Clemens Technical Symposium for Steam Cracker Furnaces focused on sustainability and efficiency enhancement 2023, Bonn, Germany.
6. **Kusenbergh, M.**, and Van Geem, K.M. From plastic waste to light olefins – opportunities and challenges. Presented as opening talk at the 5th Meeting of the College of Chemistry of the University of Lisbon 2022, online.
7. **Kusenbergh, M.**, Roosen, M., Eschenbacher, A., Biadi, E., Laudou, N, De Meester, S., and Van Geem, K. M. Towards high-quality petrochemical feedstocks from plastic waste pyrolysis oils : contaminant removal via depth filtration and its impact on steam cracking. Presented at European Ethylene Producers' Conference 2022 – Ethylene Seminar, Marseille, France.
8. **Kusenbergh, M.**, Zayoud, A., Roosen, M., Thi, H. D., Abbas-Abadi, M. S., Eschenbacher, A., Kresovic, U., De Meester, S., and Van Geem, K. M. Plastic waste contaminants: a deal-breaker for steam cracking. Presented at 34th Ethylene Producers' Conference 2022, San Antonio, TX, USA.
9. **Kusenbergh, M.**, Zayoud, A., Roosen, M., Thi, H. D., Abbas-Abadi, M. S., Eschenbacher, A., Kresovic, U., De Meester, S., and Van Geem, K. M. The effect of plastic waste compositions on the detailed hydrocarbon composition of pyrolysis oils. Presented at Chemical Technology Symposium 2021, Ghent, Belgium.
10. **Kusenbergh, M.**, Eschenbacher, A., Djokic, M. R., Zayoud, A., Ragaert, K., De Meester, S., and Van Geem, K. M. Challenges and opportunities for plastic waste pyrolysis oils as steam cracking feedstock. Presented at AIChE Annual Meeting 2021, online.
11. **Kusenbergh, M.**, Eschenbacher, A., Djokic, M. R., Zayoud, A., Ragaert, K., De Meester, S., and Van Geem, K. M. Challenges and opportunities for plastic waste pyrolysis oils as steam cracking feedstock. Presented at 33rd Ethylene Producers' Conference 2021, online.
12. **Kusenbergh, M.**, Zayoud, A., Thi, H. D., Djokic, M. R, Mys, N., Kresovic, U., Alderweireldt, N., De Meester, and Van Geem, K. M. Mixed plastic waste to olefins: from sorting, over impurities to product yields and coke formation. Presented at 32nd Ethylene Producers' Conference 2020, online.

OTHER OUTPUT

- **Kusenbergh, M.**, De Meester, S., and Van Geem, K.M. Technical report (EC-ENV/2024/VLVP/0042) – Mass balance allocation rule analysis for dual-use outputs under the Single-Use Plastics Directive (EU) 2019/904, European Commission: Directorate-General

for Environment, Publications Office of the European Union, 2025, <https://data.europa.eu/doi/10.2779/0401319>.

- Policy Engagement — Presented results of a study on Mass Balance in Chemical Recycling to EU Member State delegates at the Technical Advisory Committee (TAC) Meeting of the European Commission, Directorate-General for Environment (DG ENV) (2025).
- Webinar Host — Organized and moderated a webinar on Mass Balance in Chemical Recycling with representatives from the UK Government (2025).
- Session Chair, Plastic Recycling — 12th International Symposium on Catalysis in Multiphase Reactors / 11th International Symposium on Multifunctional Reactors (CAMURE 12 & ISMR 11), Ghent, Belgium (2024).
- European Project Contributions — Disseminated key findings from large-scale European research projects such as MATTER, WATCH, and P2PC.