



HIGFLY

HIGEE TO FURANIC-BASED
JET-FUEL TECHNOLOGY

Newsletter 3



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Welcome to the third edition of the HIGFLY project's newsletter. In this latest publication you will gain insights into the project's research into the separation of furfural and bio-oxygenates using deep eutectic solvents and supported liquid membrane technology; the adaption of the condensation and hydrodeoxygenation process in a continuous reactor; and the process for intensifying cyclopentanone synthesis from furfural using supported copper catalysts

There are also articles about the HIGFLY Final Conference, and you will be able to access all the videos from the event. In addition, there are notifications on upcoming events, and you will be introduced to a related project [BIOCTANE](#).



PROJECT PROGRESS

A new scientific publication titled “Intensifying Cyclopentanone Synthesis from Furfural Using Supported Copper Catalysts” by Adarsh Patil, Maurik J.S. Engelbert van Bevervoorde, and Fernanda Neira D’Angelo explores



catalytic strategies to enhance the synthesis of cyclopentanone (CPO) from furfural, a bio-based platform chemical.

The study focuses on Cu-catalyzed furfural hydrogenation in aqueous media, highlighting the challenges of achieving high CPO yields due to parallel furanic ring hydrogenation and polymerisation of intermediates like furfuryl alcohol (FFA). The authors propose a two-step catalytic process to mitigate these issues: first, suppressing furanic ring hydrogenation under milder conditions, and second, using tandem catalysis with β -zeolite and Cu/ZrO₂ to optimize FFA hydrogenation, achieving a

60% CPO yield.

The paper emphasises the importance of weak acid sites in the catalyst for selective FFA rearrangement and hydrogenation, and suggests that a modular, two-step approach could better address market needs. The study also discusses the long-term stability of the catalysts, noting significant deactivation due to Cu leaching. The findings contribute to the development of more sustainable and efficient methods for producing CPO from renewable biomass sources. Read and download the full publication [here >](#)

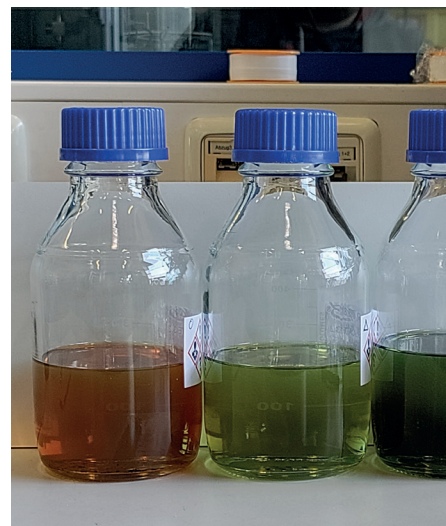
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Adaptation of the condensation and hydrodeoxygenation process in a continuous reactor

One of the main objectives of the HIGFLY project is to demonstrate a scalable technology for biofuel production from furfural and bio-oxygenates derived from sustainable biomass feedstocks. To help achieve this objective, TNO and Fraunhofer have focused on the validation of catalyst stability under long continuous operation, which was assessed by

evaluating the performance and activity of the developed catalytic systems for at least 100 hours of continuous operation. The goal is to assess the catalysts' ability to maintain their activity over an extended period of time, which is crucial for the successful implementation of the biofuel production process.

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The separation of furfural and bio-oxygenates using novel deep eutectic solvent-based supported liquid membrane technology

HIGFLY researchers are exploring innovative techniques to enhance the purification process of biofuels. A part of this process is the use of deep eutectic solvents (DES) and supported liquid membranes (SLM) as a means of purifying jet fuel precursors, specifically furfural and bio-oxygenates.

Solvents and membranes are vital in biofuel production, serving key roles in extraction, purification, and separation processes. Within

the HIGFLY project, solvents and / or membranes are used to purify the products generated from biomass feedstocks. These technologies minimise waste generation, improve energy efficiency, and enhance the scalability of biofuel production. By facilitating cleaner and renewable production processes, solvents and membranes contribute to environmental sustainability and reduce dependence on fossil fuels.

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The HIGFLY Final Conference: Trends & Technology Needs for Biobased Fuels & Chemicals

The HIGFLY Final Conference, held at Eindhoven University of Technology on September 20th, 2024, brought together key stakeholders to discuss the advancements and prospects in sustainable aviation fuel (SAF) and biofuel technologies. The event showcased the outcomes of the HIGFLY project, which focused on creating high-quality aviation fuels derived from sustainable biomass feedstocks through innovative catalytic processes.

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All the presentations from the HIGFLY Final Conference are available on the HIGFLY YouTube channel and website >

[WATCH THE VIDEO >](#)



RELATED NEWS

Flying green on biological waste

Over the past four years, a consortium of academia, applied research institutes and industry, led by EIRES researcher Fernanda Neira D' Angelo, has been developing processes for the production of sustainable aviation fuels based on second-generation biomass. During the HIGFLY project's final conference on 20 September at TU/e campus, the nine project partners shared results and discussed trends in biomass conversion.

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SkyNRG releases Sustainable Aviation Fuel Market Outlook 2024

The SkyNRG Sustainable Aviation Fuel Market Outlook covers the current state and trends of the SAF market in the EU and UK, the US and rest of the world by assessing announcements of SAF projects and mapping out the capacity until 2050.

For the first time, the report is expanding to global coverage and presenting all the latest policy developments. Notably, Japan, Singapore, India, Brazil, British Columbia...

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RELATED PROJECTS

The BIOCTANE project is tackling one of the most challenging areas of decarbonisation—the aviation sector—by developing advanced biofuels from organic waste streams. It integrates biotechnological, thermochemical, and catalytic conversion methods to produce renewable jet fuel, maximising carbon efficiency. This contributes directly to the EU's 2050 goals by promoting the use of “green”

fuels such as drop-in biokerosene.

A key aspect of the project involves converting complex organic waste into valuable compounds like 2,3-butanediol, which are subsequently transformed into hydrocarbons suitable for jet fuel. The process aims to optimise catalytic steps, ensuring scalability and energy efficiency.

Through extensive collaboration, BIOCTANE is expected to con-

tribute significantly to reducing aviation greenhouse gas emissions. It's not just focused on technical feasibility but also includes economic and environmental assessments, ensuring the biofuels produced are competitive and sustainable for long-term use in commercial aviation.

Learn more about the BIOCTANE project by visiting their website >

<https://www.bioctane.eu/>



UPCOMING EVENTS

Future of Biofuels 2024

23rd – 24th October 2024
Copenhagen, Denmark

This year we are focusing on production and implementation of biofuels and future fuels in maritime and aviation sectors to speed up their decarbonization. Other points of focus are: development of new supply chains, latest trends and perspectives for low carbon fuels in fuels mix but also new production technologies, refineries case studies and more. The event is set to bring industry stakeholders, unique content, workshop style discussions and networking. Gives an opportunity to showcase your products and services in the networking area and hold meetings with leaders from the industry.

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ECOMONDO 2024

5th – 8th November 2024
Rimini, Italy



ECOMONDO
The green technology expo.

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Over 99k green & circular economy professionals from 120 countries

ECOMONDO is the international benchmark event in Europe and the Mediterranean hub for technologies, services and industrial solutions in the field of green and circular economy.

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Greener Manufacturing Conference and Expo 2024

13th – 14th November 2024
Cologne, Germany

The Latest Sustainable & Circular Solutions: Greener Manufacturing Conference & Expo is the largest, free to attend trade fair and conference for renewable and circular manufacturing solutions which reduce the impact of industrial and manufacturing processes on the environment and global climate change. Held as part of Sustainable Industry Week, it provides visitors with the perfect opportunity to source new solutions across the entire supply chain to meet the growing demand for sustainable and circular.

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COMING UP IN THE NEXT EDITION!




In the fourth and final edition of the HIGFLY newsletter we will be bringing you updates and publications on the project's results and provide you with a complete overview of the project and where you can access all of the project's scientific papers, posters, communication materials, videos, and much more!



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And you can follow us on our social networks:

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