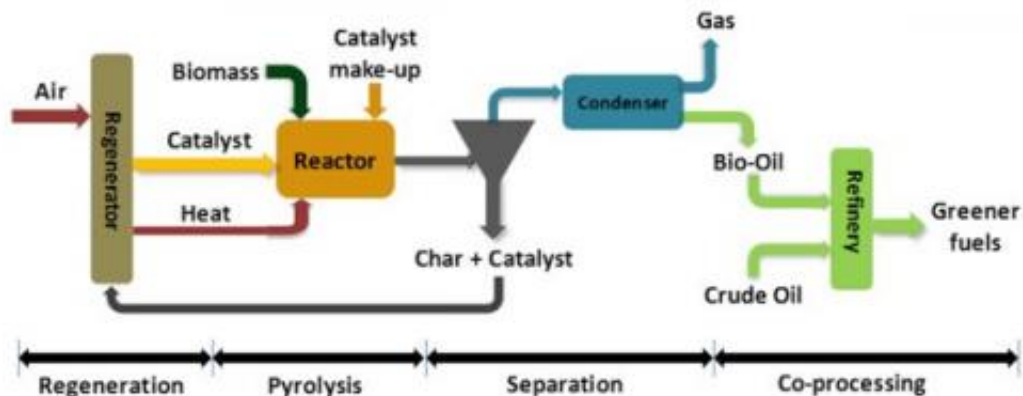


# More energy from biofuel

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Oil produced from biomass - such as wood chips or plant residues - seldom has the same quality and energy content as 'classical' crude oil. A new, simple catalyst, developed at the University of Twente, improves the quality of this oil before it is even transported to the refinery. This technology was selected from dozens of projects for the follow-up of CATCHBIO, the national research programme that is helping to realize the European 2020 objective: 20% of fuel must come from renewable sources by 2020.

The oil in current-generation biofuel does not come from fruit or seed, such as palm or rape seed oil but, for example, from plant residues, pruning waste and [wood chips](#). As a result, there is no longer any undesirable competition with the food supply. Converting plant residues,

which take up a lot of space, into oil simplifies transport considerably and the product can go directly to a [refinery](#). Blending with [crude oil](#) is already possible. However, the quality of this oil does not yet equal that of crude oil. It has a lower energy content per litre, is acid and still contains too much water. The catalyst developed by Prof. Leon Lefferts and Prof. Kulathuier Seshan's group Catalytic Processes and Materials (MESA+ Institute for Nanotechnology/Green Energy Initiative) significantly improves the quality and energy content of the oil.

## **Better than crude oil**

This is realized by heating the oil in nitrogen to 500 degrees Celsius and by applying a simple catalyst: sodium carbonate on a layer of alumina. By using this method, the [energy content](#) of the oil can be boosted from 20 to 33-37 megajoule per kilogram, which is better than crude oil and approximates the quality of diesel. The technology, recently defended by PhD candidate Masoud Zabeti, is already being tested by KIOR in Texas, USA, on a small industrial scale, with a production of 4,500 barrels of oil per day. The quality of the oil can be improved even more by adding the material caesium, as well as sodium carbonate. "By doing so, we can, for instance, also reduce the aromatics, which are harmful when inhaled", says Prof. Seshan.



The technology is currently being further studied, in cooperation with the University of Groningen, the Energy research Centre of the Netherlands (ECN) and Utrecht University, in a new CATCHBIO programme of the Netherlands Organization for Scientific Research (NWO). The Netherlands is committed to leading the way in research on technology that will help realize the European 2020 fuel objective.

Provided by University of Twente

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