# Combination of processes results in cleaner petrol

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One problem confronting the oil industry is that extracted mineral oil (due to increasing scarcity) is becoming heavier and 'dirtier'. This is reflected, for instance, in a higher content of aromatics (which among other things lead to soot emissions during combustion in diesel engines) and of sulphur (which among things causes acid rain). At the same time, the global ceilings for aromatics and sulphur content in fuels are becoming increasingly strict.

The Delft-based PhD student Xander Dupain has investigated a method which produces cleaner petrol using the method of 'catalytic cracking'. Catalytic cracking, with a worldwide processing capacity of over 500 million tonnes of oil per year, is one of the most important processes applied in modern oil refineries and the prime method for making petrol from oil. In addition it is an important way of producing diesel blends and valuable products such as propene and butene. The disadvantage of catalytic cracking is that a further expensive process (hydrotreatment) is often required to render the petrol and diesel sufficiently clean and bring it into line with the necessary specifications.

The core of Dupain's method is a combination of catalytic cracking with the Fischer-Tropsch Synthesis process. This chemical process was invented in the 1920s by the German researchers Franz Fischer and Hans Tropsch and further developed in Germany during the Second World War for the production of synthetic fuels from coal. Due to the relatively low oil prices in the period following the Second World War this method then mostly went out of fashion, with the exception of South Africa

where – prompted by the international oil embargo – it was applied by the Sasol company to meet fuel demands. In recent years, as oil prices rise, the process has been experiencing a revival: with the activities of Shell in Malaysia and Qatar, for instance. It is now primarily being applied to obtain relatively clean synthetic diesel from natural gas and to make a series of other products which contain extremely low concentrations of sulphur, nitrogen and aromatics. Dupain believes it can be economically and environmentally interesting to catalytically crack the fairly 'heavy' faction (waxes) which is created by the Fischer-Tropsch Synthesis process. At the moment this cracking is still done using expensive hydrocracking that focuses mainly on the production of diesel and that also involves high consumption of hydrogen.

Catalytic cracking of the products from Fischer-Tropsch Synthesis results in clean and high-quality petrol. Moreover, it is possible to produce good diesel as a by-product – and the process also creates relatively large quantities of propene and butene. Is it above all this latter aspect that leads Dupain to think that the combination of a Fischer-Tropsch installation with a catalytic cracker can also be interesting in economic terms. After all, propene is an important raw material for the plastics industry. Demand for propene is set to rise in the coming years.

Source: Delft University of Technology