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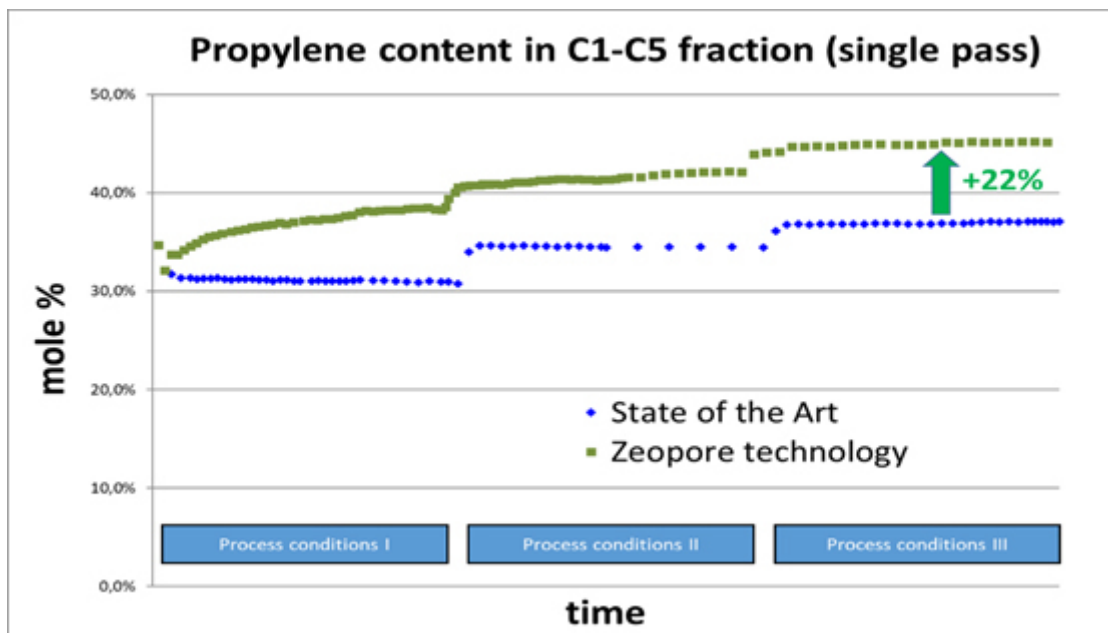
Zeopore catalyst innovation yields 20% profitability increase in the growing worldwide methanol-to-olefins market

Zeopore targets global leadership in developing and commercialising mesoporous zeolite catalysts for refining, petrochemistry, biomass conversion and plastics recycling



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Zeopore's optimisation of a conventional ZSM-5 zeolite resulted in a remarkable 15 to 25% higher propylene selectivity. As a result, the propylene/ethylene and olefin/paraffin ratios both nearly doubled.

The worldwide production of methanol is on a long-term rise. Catalyst innovations on the level of zeolite mesoporation enable Zeopore to

significantly boost the economies of methanol-to-olefins conversion. Zeopore's mesoporization technology applied to an off-the-shelf ZSM-5 zeolite enables porosity and acidity tuning as well as in-situ metal additive inclusion and a higher dispersion. Besides the expected catalyst lifetime multiplication, the tests by Zeopore show strongly increased propylene and olefin selectivity in a single pass, increasing productivity 15 to 25% depending on process conditions.

The growing market of methanol to propylene and other olefins

The amount of methanol produced yearly is projected to grow 5% annually over the foreseeable future. Methanol production reduces CO₂ emissions and largely results from the conversion of syngas, gained from both fossil and renewable sources, or from biomass fermentation.



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About 20% of the acquired methanol is converted further into olefins, mainly propylene, for plastics production. This methanol-to-olefins conversion is looking at a staggering growth of 30% over the next five years, even including Covid-19 impact, and is the fastest growing segment of methanol consumption. Producers, driven by varying methanol and propylene prices, seek to further secure and increase their profitability, mainly through enhanced olefin selectivity and reduced operational costs.

Zeolite mesoporisation excellence pushes process impact

Apart from their favorable intrinsic properties (e.g. acidity, crystallinity, stability), zeolite catalysts used today suffer from a narrow micropore structure. This provokes access and diffusion limitations, resulting in only a minor part of the

surface area of zeolites being efficiently utilized. Zeopore adds a secondary level of larger mesopores to conventional zeolites to increase their catalytic efficiency by improving access to the active sites located in the zeolites' micropores.

By meticulously tuning the porosity and other zeolitic properties, Zeopore is able to steer the selectivity towards desired fractions and improve the stability of the catalyst for each individual process. The know-how and technologies of Zeopore allow for coupling the benefits of high-quality accessible zeolites with a low-cost and tunable manufacturing process.

Many zeolite catalysts involve a metal function to yield the optimal catalytic performance, in reactions such as methanol conversion but also hydrocracking, dewaxing and even FCC. Zeopore has developed patented methods to include the deposition of key metals during the mesoporization process, yielding unprecedented metal dispersions, enable unsurpassed metal loadings, and reducing the overall cost of introducing the metal function.

Unique added value in methanol-to-propylene

Concretely, Zeopore used its versatile toolbox to demonstrate the added value in the methanol-to-propylene process on a ZSM-5 zeolite. Zeopore executed extensive tests under industrially relevant process conditions on a laboratory-scale testing unit.

Unique boost in propylene and olefin selectivity: Zeopore's optimization of a conventional ZSM-5 zeolite resulted in a remarkable 15 to 25% higher propylene selectivity. As a result, the propylene/ethylene and olefin/paraffin ratio's both nearly doubled.

Catalyst lifetime expected to be tripled: The test program did not include lifetime extension assessment. Yet, based on earlier testing experiences of Zeopore,

and a confirmed lower production of coke precursors, the lifetime of the a mesoporized zeolite catalyst is expected to be more than tripled.

Boosting methanol-to-propylene profitability

For average market prices of methanol and propylene, the benefits as described above would lead to approximately 20% higher profitability for a standard methanol-to-propylene production plant. Boosting the economic viability of this interesting syngas-to-olefins pathway is made possible through Zeopore's advanced mesoporation technology in refining and petrochemistry, and more specifically in the methanol-to-propylene conversion.

Zeopore is a technology development company focusing on license or product supply agreements with innovative catalyst suppliers in the world. Zeopore is open for scale-up and industrial validation runs in the exciting methanol-to-propylene application in order to boost the overall profitability in this value chain.

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