

Intelligence on Technology, Compliance and Refining Processes ... Worldwide

New Zeolite Catalyst Technology Would Boost Diesel, Gasoline Output

New Jersey-based Rive Technology announced Jan. 13 that it's opening a new R&D facility focused on commercializing new zeolite catalysts that would boost diesel and gasoline yields compared to conventional zeolites.

Rive claims its catalyst technology "significantly increases the yields of transportation fuels produced from a barrel of crude oil and enables refiners to improve throughput and boost profitability." The new R&D facility now employs eight researchers and would double the head-count this year, Rive says.

"The company continues to expand its team and is hiring experienced chemical engineers, scientists and lab technicians to support R&D activities aimed at optimizing the performance of Rive's zeolite catalyst technology and driving product commercialization," Rive said in a press statement. "The zeolite catalyst technologies that will be researched and developed at the Monmouth Junction facility involve a proprietary method of modifying the pore structure of a zeolite, making the zeolite more accessible to larger molecules in a feedstock.

"By selectively introducing mesopores (pores nearly four nanometers in diameter) into a zeolite, Rive allows larger molecules to access the zeolite and get 'cracked' into valuable products. Further, the cracked products, such as gasoline-range molecules, are able to exit the zeolite before they overcrack to lighter, less valuable gases.

"As a result, petroleum refiners obtain a higher yield of desirable products such as gasoline, diesel fuel, and propylene, and less of undesirable products like heavy cycle oil and coke." Rive's execs include two former Aspen Tech execs: Larry Evans, founder of Aspen Tech's well-known refinery process control systems, and Andrew Dougherty, corporate development manager. Also on the Rive leadership team is Javier Garcia Martinez, company founder. Garcia invented Rive's core technology while a post-doctoral student at MIT. Since then, he has focused on nanotechnology and materials science.

Rive's VP of R&D is Larry Dight, formerly a process development engineer and eventually director of R&D for petroleum catalysts at BASF (formerly Engelhard), where he was involved in fluid catalytic cracking (FCC) catalyst development.

In an interview with Hart Energy Publishing, Dight explained that the mesopores that Rive is developing would be about five to six times the size of conventional zeolite pores in FCC catalysts. Initial Rive applications are seen in FCCs, but could be expanded to other diffusion-controlled platforms including hydrocracking, he said. Both fuels refining and chemical applications are foreseen. "Everyone would love to do mesopores," Dight told us, "but no-one does it for commercial application in FCC, and I'm not aware of other commercial applications" anything like what Rive is developing. "Certainly not with our size or quantity," he said.

Rive has investigated manufacturing cost of the scheme. While adding mesopores will add cost, "the value it delivers far outweighs the cost," he said.

As for its business development model, Rive already has a non-exclusive "preliminary relationship" with one of the "big 3" FCC catalyst makers (either Albemarle, BASF or Grace-Davison). The strategy is for Rive to realize revenues via a relationship with at least one existing FCC catalyst maker, rather than manufacturing the catalysts itself.

As for commercial introduction of the technology, the target is in the 2011 time-frame, as Rive's VP-operations Andrew Dougherty explained to us. Refiners world-wide would be targeted for commercialization, he said.

Initial commercial-scale applications likely would be with certain customers of FCC catalyst makers; some refiners are more aggressive than others about trying new technologies. Since Rive has venture-capital investors, the business plan eventually would include an IPO or sale, he added.

A technical paper explaining the new technology possibly might be ready for a refining conference in the latter part of 2009, Dight added. -- Jack Peckham