Argonne NATIONAL LABORATORY

News Release

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For immediate release

Integrated Fuel Technologies gets worldwide license for Argonne-developed Diesel DeNO$_x$ Catalyst

Technology reduces nitrogen oxide emissions by stunning 95 percent

ARGONNE, Ill. (July 1, 2008) – A new, patented catalyst developed by scientists at the U.S. Department of Energy's (DOE) Argonne National Laboratory to reliably and economically reduce 95 to 100 percent of the nitrogen oxide (NO_x) emissions from diesel-fueled engines has been licensed to Integrated Fuel Technologies, Inc. (IFT), a start-up company based in Kirkland, Wash.

IFT plans to integrate the technology – named Diesel DeNO$_x$ Catalyst – into the firm's existing products that reduce emissions of greenhouse gases, said IFT president Robert Firebaugh. The products could be sold to original equipment manufacturers (OEMs).

"OEMs have expressed an interest in IFT products enhanced with the Diesel DeNO$_x$ Catalyst," Firebaugh said. "These companies want to know if the technology can survive continuous testing."

"The catalyst can also be easily retrofitted for installation on existing diesel engine vehicles," said Christopher Marshall, the Argonne chemist who led the development of the technology. "There is a potentially large pool of customers for this technology, given the 11 million diesel engines currently on the road."

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Emissions of NO_x are regulated by the U.S. Environmental Protection Agency (EPA), which began implementing on Jan. 1, 2007, a more stringent regulation to reduce releases of the smog-causing pollutant by 2.6 million tons a year on a phased-in basis through 2010. Standards set by the California Air Resources Board (CARB) are the strictest in the United States. Argonne and IFT aim for the Diesel $DeNO_x$ technology to meet CARB standards.

IFT is also collaborating with Argonne under a two-year research agreement to test the technology's longevity in real-world use and to demonstrate it in real-world applications to determine if it can meet a broad array of transportation applications.

The Diesel $DeNO_x$ Catalyst is a coating that is applied to a ceramic brick, like a catalytic converter, which is installed in a vehicle's emissions system. The technology works in conjunction with the particulate matter (PM) trap's filter. The PM trap's filter removes soot from diesel exhaust, which is then processed by the Diesel $DeNO_x$ Catalyst to remove NO_x emissions.

"The key to the Diesel $DeNO_x$ Catalyst technology is the reductant," Marshall said. "Interestingly, it is the diesel fuel that reduces the NO_x to nitrogen, a harmless compound that composes about 72 percent of the Earth's atmosphere. The catalyst achieves such high rates of conversion because of its interactions with the hydrocarbons in the diesel fuel. The reduction in NO_x emissions comes as a result of its conversion into nitrogen."

Moreover, the Diesel $DeNO_x$ Catalyst has increased performance in the presence of water vapors. "That characteristic makes it ideal for use in automotive and truck exhaust systems, where water is always present," Marshall said.

Marshall and Argonne fellow researchers have also found the Diesel $DeNO_x$ Catalyst to be economical to make and use. The technology uses inexpensive metals — copper and cerium. Using diesel fuel as the reductant eliminates the need for onboard storage of compounds like ammonia or urea that existing technologies use as reductants, he said. Compared to existing technologies, Marshall said, Diesel $DeNO_x$ reduces the amount of additional weight a vehicle has to carry, allowing for more efficient use of a vehicle's fuel.

"Furthermore," he said, "the ultra-low sulfur diesel fuel that will soon be required for off-road use and is now mandated for on-highway use actually extends the life of the catalyst technology, which is poisoned by the sulfur."

The Diesel $DeNO_x$ Catalyst is a low-cost technology given the usable lifetime of the catalyst, which is about 400,000 miles. A typical semi-tractor trailer or shipping and delivery service truck is driven about 45,000 miles in year, according to the American Trucking Association.

Funding to develop the Diesel $DeNO_x$ Catalyst was provided by Argonne's Laboratory-Directed Research and Development program.

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